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An analysis of student collaboration and task completion through project based learning in a web-supported undergraduate course

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AN ANALYSIS OF STUDENT COLLABORATION
AND TASK COMPLETION THROUGH PROJECT-
BASED LEARNING IN A WEB-SUPPORTED
UNDERGRADUATE COURSE

A Dissertation

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
Doctor of Philosophy

in

Educational Leadership and Research

by
William Randall Thomas
B. A. Louisiana State University – Shreveport, 1987
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ABSTRACT

Over the past decade calls for reform in higher education have emphasized that education should become less instructor centered with students taking a more active role in their learning. Moreover, there is increasing pressure on university professors to implement student centered teaching strategies that negate time and place restrictions of the classroom by integrating technologies that support the active engagement of students through Internet based applications. The goal of this study was to gain insights into the interactions that occur in online communications in a project-based learning activity. Twenty-one undergraduate students participated in the study while completing a component of a course that incorporated a collaborative project as part of the requirements for completion. A multi-case study was conducted on six collaborative groups, focusing on the types and frequencies of interactions that occurred within each group and the perceptions that students had of their experiences in this type of learning environment. An interaction analysis model was developed by the researcher for this study based on established models and observations in preliminary analysis of the online dialog. It was found that the interactions that occurred online closely followed established steps in the problem solving process. There were also indications that the type of system used for online communications (asynchronous and synchronous) is an important factor in task appropriateness. The findings of this study also revealed that high and low achieving groups differ in frequency and temporal aspects of their online interactions. Students also differentiated between asynchronous and synchronous systems as to the type of tasks that are best suited for each. There was a general consensus that asynchronous systems are best for tasks that require reflection time and deeper thought and

synchronous systems are best for brainstorming and as a forum for the free flow of ideas. The latter also seems to be more conducive to situations that require solidarity building and group social connection. The findings of this study provide valuable information that contributes to the body of literature in online learning, provided practitioners with insights into the importance of the interactions that occur, and provides researchers with possible future studies that are relevant to this immerging field of education.

CHAPTER 1

INTRODUCTION

Overview

There are growing calls for reform in postsecondary education including a new emphasis on the learning process and the environments where learning occurs, on the characteristics of students and how these might effect learning, and on how new technologies might contribute to learning (Chickering & Gamson, 1987; Duderstadt, 1997; Kuh, 1999; Laserson, Wagener, & Shumanis, 2000; Magolda, 1992; Pascarella & Terenzini, 1998; Prokasy, 1991). A new breed of learner is emerging, one that is savvy to new information technologies and is more than willing to use them in their learning experiences (Munitz, 2000). These new technologies provide environments where students can communicate at any time and place and breaks down the barrier of classroom walls. Students can interact and collaborate with their peers in a variety of learning activities such as group projects, online discussions, and peer academic support. To better facilitate the use of these technologies it is important that instructors have an understanding of the learning process, the characteristics of students, and how these interact when students collaborate in these online learning environments.

A shift from lecture-based learning environments to a social constructivist paradigm in which students are encouraged to work collaboratively in solving problems, to arrive at agreement on controversial issues, or to complete projects that support curriculum outcomes is now necessary so that college learners are provided with a well rounded educational experience that prepares them for the workplace (National Research Council, 1996; National Science Foundation, 1996). The

remainder of this chapter provides an introduction to the theoretical issues and research that are relevant to implementing online learning environments into the college classroom.

Theoretical Issues

Active Learning

A realm of learning theories that has become of particular interest in educational circles is the social cognitive perspective of learning. Social constructivism is a branch of this perspective in which students are actively involved in their learning and are curious about the world around them. It is known that we learn best when placed in environments that encourage discovery and exploration and in which we are exposed to learning activities that promote collaboration, cooperation, and teamwork between learners (Bruner, 1966; Piaget, 1985; Vygotsky, 1978). Instructional practices encouraging student-centered learning and a more active role in the creation of their own knowledge is becoming the preferred mode of choice among some educators (Bruffee, 1999; Lattuca & Stark, 1995; Magolda, 1992; Spear, 1989).

One aspect that is vital in the cognitive development of learners is the interactions that take place between students (Doise & Mugny, 1984). When instructors simply transfer knowledge to receptive students a surface approach to learning is adopted by the learner, but when the learning is placed in the hands of the student, a deeper approach to learning can be accomplished (Trigwell, Posser, & Waterhouse, 1999). One way to develop a deeper approach to learning is to provide students with opportunities to engage in projects in which a final product is jointly produced through collaboration and group work. There are numerous models in the business community in which a team approach for carrying out project tasks is incorporated into strategies for accomplishing organizational goals. In many of these situations computer support is a central

element in interactions and communications among team members. There has been a growing interest in how these models might be utilized in an academic setting.

Getting students actively engaged in their learning requires that we take an antithetical approach to traditional forms of instruction (i.e. lecture, class discussion). Active learning should be what lecture is not. Learning should encompass talking and listening, reading, writing, and reflecting, allowing students to make clarifications, ask questions, consolidate information, and acquire new knowledge (Meyers & Jones, 1993). Students talk more than listen, develop their own skills more than receive information, are involved in higher order thinking, are engaged in activities, and explore their own attitudes and values in an active learning environment (Bonwell & Eison, 1991). Active learning is one of the “Seven Principles for Good Practice in Undergraduate Education” proposed by Chickering & Gamson (1987). These principles synthesize decades of research on undergraduate education and are based on the principle that education is an active, cooperative, and demanding endeavor. (Gamson, 1991).

Collaborative Learning

Effective pedagogies should encourage learners to experience and practice the language of “intellectual communities” that are valued in academic and professional circles (Brody, 1995). In order for students to become members of these communities the principles of cooperative/collaborative learning must be applied in the learning environment (Bruffee, 1991; Johnson, Johnson, & Smith, 1991; Slavin, 1991). Collaborative/cooperative learning activities, when properly implemented, may significantly affect the quality of learning and the effectiveness of instructional methodologies. Students who work in groups, in a collaborative or cooperative environment, often reach or surpass the performance levels of students who work in competitive or isolated learning experiences (Johnson, Maruyam, Johnson, Nelson, & Sloan, 1981; Johnson, Johnson, & Smith, 1991; O'Donnell & O'Kelly, 1994; Slavin, 1983; Slavin, 1991).

Collaborative learning is the unstructured process of interaction between individuals where goals are negotiated, problems are defined, procedures developed, and socially constructed knowledge is produced (Springer, Stanne, & Donovan, 1999). Distinctions can be made between cooperative and collaborative learning through the degree of control that the instructor has over the learning activity. In cooperative learning the instructor directly guides the group towards predetermined outcomes, encouraging members to work as a team to reach these goals. On the other hand in collaborative learning environments the instructor encourages group members to determine their own outcomes and to work together to accomplish these outcomes, making them more responsible for their own learning.

Much of the research on the effectiveness of collaborative learning has been conducted at the K-12 level and there appears to be evidence that there are gains in achievement and positive affective results for those students who participate in projects that are collaborative or cooperative in nature. At the collegiate level there are fewer studies concerning achievement when using collaborative group projects. Existing research indicates that there may be some gains in achievement and the development of higher order thinking skills when students work collaboratively (Dansereau, 1993, Frierson, 1986; Johnson, Johnson, and Smith, 1991). There are also studies that suggest that affective and academic gains may be directly linked to the proper use of collaborative activities in the classroom (Cook, 1991; Dobos, 1996; Livingstone & Lynch, 2000; Springer, Stanne, & Donovan, 1999). Based on these findings, instructors in higher education are challenged when they attempt to incorporate the foundations of effective collaboration that promote active learning and encourage a student- centered environment.

Computer-Mediated Communication

Supporters of the social constructivist viewpoint of learning encourage a shift in the paradigm of instructional technology research from one based on strict behaviorist or cognitive perspectives to models that align themselves to social cognition. Social constructivist viewpoints, socio-cultural theories, and theories of situated cognition have all contributed to a greater interest in how the social aspects of learning are reshaped and enhanced by the technological tools that are used to support instructional methodologies (Koschmann, 1996). Computer supported learning environments have emerged in which students exchange ideas, coordinate activities, resolve conflicts, and come to a final consensus using online communication systems. (DeBard & Guidera, 1999-2000; Hemlo, Buzdial, and Turns, 1998; McComb, 1994).

Computer-Mediated Communication (CMC) has been used as a stand-alone tool for about two decades (discussion boards, listservs, and e-mail being the predominant modes) in both corporate environments and in educational settings. Two modes of communication, asynchronous and synchronous, are often utilized in both settings and a description of each follows. Asynchronous communication is analogous to those forms of communication in which discourse occurs in a manner in which one must wait on a response to an inquiry. A good example of this might be a person's voicemail system or an answering machine. The predominant digital asynchronous communications consists of online conferencing, e-mail, or listservs. Online conferencing usually consists of an interface in which participants create new discussion topics (known as discussion threads) and others then respond to these threads. E-mail and listservs are much like everyday postal mail (snail mail in cyber talk) in which memos are sent to receiving parties and then they have the choice of responding to these memos. E-mail would be akin to

sending a letter between individuals and listserves is much like sending and receiving bulk mail outs.

Conversely, synchronous communications occurs in real time much like talking to someone on a telephone. America-On-Line “chat rooms” are one form of synchronous communications that has become popular in recent years. A somewhat similar form of digital communications has been used in educational settings for some time and is known as Internet Relay Chat (IRC), which is a protocol for establishing a standard for the delivery of synchronous communications. To participate in an IRC session one must obtain and run a program called a “client” and connect to a server on an IRC network server that then relays these messages to other servers on the network. The dialog is linear and continuous with messages popping up in a stream of conversation as responses are entered (Caraballo & Lo, 2000; Walker, 1997). MUDs (Multi User Dungeons, Multiple User Dimension, or Multiple User Dialogue) have their roots in Internet based interactive role-playing games but are now considered as a legitimate means for online collaboration by educators and those in corporate environs (Evard, 1993; Fanderclai, 1995). In a MUD users take on a computerized persona, avatar, character, or incarnation and virtually walk around talking and interacting to others in the online environment. MOOs (MUDs that are object-oriented) are extensions to MUDs in which the gaming emphasis is downplayed and a more socially virtual interactive space is available for participants to interact with cyber-objects, as well as, engage in live dialog with others. MOOs are better equipped to support educationally oriented live conferences and meetings.

Recently, more integrated collaborative work tools known as Groupware and Group Support Systems (GSS) have been increasingly integrated into corporate environments to facilitate team based projects. These systems include both asynchronous and synchronous communications

tools, as well as software programs that facilitate brainstorming, aids in the creation of artifacts, and allows users to organize and present their results efficiently and effectively. Intranets have long been the standard for collaboration in the business world. In these environments workers are provided with online tools in which communications software and software that allows multiple user access to digital documents are integrated into an interface that is conducive to group work. Not until recently have instructionally oriented web environments, also known as courseware management systems, that are similar to Groupware and GSSs been widely available to students in academically related forums.

CMC in Higher Education

Over the past two decades Universities have been implementing online instruction as part of their overall plan to integrate technology into the curriculum. In the past, asynchronous and synchronous CMC systems have often been an integral part of online courses for students in which distance and time constraints prevent participation in traditional on-campus instruction. Now university administrations are encouraging and in some cases requiring instructors to use online technologies and tools as a supplement to traditional on-campus courses. These practices may be simply making materials (syllabus, handouts, assignments) available through an Internet connection (Anderson, 1997). At the other end of the spectrum these environments often replace many traditional classroom practices. These might include making class materials available online, giving students online access to grades, providing links to course relevant Internet sites, and offering communications components such as e-mail, chat rooms, or conference areas where students can interact with the instructor and their peers. The degree to which instructors might implement online resources for their students will now be described.

Boettcher (1999) describes four categories of Web courses: Web presence, Web-enhanced, Web-centric, and Web-course. A Web presence course provides information about a course

including faculty information, course outlines, bibliographies, course requirements, and the evaluations of previous students who have taken the course. If course materials and resources such as handouts, assignments, and Internet links relevant to course content are made available in a Web environment then the course is considered a Web-enhanced course. A Web-centric course can be characterized as a shift from traditional face-to-face interactions in the classroom to a greater reliance on the Web for communications. This type of web course relies less on meeting at regularly scheduled class times and requires students to spend a greater amount of time utilizing the communications technologies and tools of the Web. When students participate in courses that are conducted entirely online with no scheduled class meetings it is considered a Web-course. In the context of either a Web-enhanced or a Web-centric course CMC is often used as a supplemental mode of communication in both student-instructor and student-student interactions. Several course management systems have been developed in recent years that make development of courseware more efficient and user friendly for instructors. Among these is Blackboard (2001), which was the chosen method of online course development for this study.

Research on the Effectiveness of CMC

There is a growing body of research that indicates that using CMC may have certain benefits to college students when used as a supplement to traditional higher education courses. These include the expansion of the dialog that typically occurs in on-campus classes, a shift in the balance of power from the instructor to students, and providing a more efficient means of facilitating the day-to-day maintenance of classroom activities (McComb, 1994). Research on the effectiveness of using CMC in the college classroom has focused on two major issues. The first compares face-to-face learning with online learning and the second examines CMC in the context of courses delivered exclusively online or as a supplement to traditional classroom activities. Traditional face-to-face learning and learning in which CMC is used as a tool are comparable in

the quality of learning that takes place, in student-instructor and student-student interaction and in student feelings and attitudes towards learning and perhaps CMC may surpass traditional pedagogies.

CMC can be superior to traditional methods of instruction (Hiltz, 1997), be more efficient and effective (Benbunan-Fich & Hiltz, 1999; Thoennesen, Kashy, Tsai, & Davis, 1999), and critical thinking skills can be improved (Newman, Johnson, Cochrane, & Webb, 1996). The increased access to educational opportunities, the time it takes one to complete a degree program, the attainment of a higher quality of learning, and increases in performance on course assessments are advantages to using asynchronous learning networks when students are actively involved and instructional strategies are properly implemented (Hiltz, Coppola, Rotter, & Turoff, 2000).

Interaction among students and instructors is considered an important variable in the process of learning (Holmberg, 1994; Moore & Kearsley, 1996). CMC may lead to increased instructor-student and student-student interactions (Bielema, 1997; McComb, 1993; Thoennesen, Kashy, Tsai, & Davis, 1999). Computer conferencing can increase student involvement, encourage community between students, and provide a forum for those students that may not participate in traditional in-class activities and discussions (Bannon, 1995; Chong, 1998; Harasim, 1990; Hiltz, Fjermestad, & Lewis, 1999; O'Malley, 1995; Sudweeks & Allbritton, 1996). Students might engage in learning activities such as online discussions and debates, the analysis of real-world cases in the subject area, as peer support and study groups, or to develop products in project-based learning activities.

Affective outcomes when using CMC in educational settings are mixed. Higher levels of satisfaction occur in courses conducted online versus those taught in traditional face-to-face learning environments (Althaus, 1997; Hiltz, 1997; Irani, 1998; Thoennesen, Kashy, Tsai, &

Davis, 1999). However, this is not always the case. Negativity maybe due to a lack of familiarity with the CMC systems and to student preconceived notions about the nature of learning and one must consider these when including online learning in their teaching strategies (Chong, 1998; McComb, 1993). Positive affective outcomes are noted in the literature when students use CMC to collaborate (Kitchen & McDougall, 1998-99).

Rationale for the Study

There are few definitive, substantive studies on using CMC in learning activities that are project based, particularly none that investigate how tasks are negotiated and accomplished in this environment. However it has been suggested that positive effects in the collaborative processes that occur in the college classroom may be directly influenced by the inclusion of CMC as a tool (Feather, 1999; Florea, 1998; Fowell & Levy, 1995). The research that is available has for the most part investigated the differences that are evident in student achievement, participation in course related activities, and on student satisfaction in using CMC in the learning process. There is a need to identify the characteristics of students that perform well in problem-based learning activities that are conducted in online learning environments. It is also important to understand the kinds of problem solving strategies that successful student groups apply in their online interactions and to develop models that show us what these interactions look like.

A more active learning process proposed by Chickering & Gamson (1987) in the “Seven Principles for Good Practice in Undergraduate Education” may very well be accomplished by providing students with problem-based activities. Applying real world situations to learning is important in developing well-prepared professionals, particularly in the Information Age. It is important that instructors understand the nature of online communication to properly integrate it into their teaching strategies. The interactions that occur between students in this environment are important in the effectiveness of the learning experience and in their overall satisfaction with this

technology. The analysis of the online discourse in this study provides valuable information that can be used by practitioners, researchers, and instructional designers in understanding how to effectively facilitate the use of CMC in a project-based, collaborative learning environment.

Problem Statement

Purpose of the Study

The purpose of this study was twofold. First, to better understand how students functioned in a Web-based, collaborative learning environment in the postsecondary classroom for which project-based learning is the method of instruction, it is important to understand how tasks are negotiated, carried out, and completed in both synchronous and asynchronous systems. Online interactions were documented to provide information about the strategies used by students to complete project tasks. The second purpose of this study was to gain insights into student perceptions and attitudes towards the process of organizing, carrying out, and completing a project-based, collaborative learning activity in an online environment.

Context of the Study

Because university students have high demands placed on their time and efforts and collaborative, project-based activities often require more time outside of the classroom environment. CMC may offer an efficient and effective way of collaborating with their group members. This study investigated collaborative learning in a university undergraduate course that is an elective for many non-education majors. The course is primarily one that is applied and production oriented where students have direct access to a computer lab for completion of required elements. There was a limited amount of time that could be devoted to in-class collaboration and it was necessary for students to engage in collaboration outside of class. The collaboration involved a project-based learning activity in which students were required to build a Web site using information gained both inside and outside of the lab. To facilitate this, electronic collaboration

CMC tools, particularly conferencing and IRC chat, were chosen as the vehicles for communications beyond regularly scheduled class times.

Research Questions

The first question guiding this research was what kind of interactions occur between group members in the process of completing a project-based learning task in a computer mediated learning environment? The underlying questions, some of which were established prior to conducting the research and some which emerged were:

- How did the online interactions within groups evolve over the phases of planning, design, and development of their projects?
- How did the online interactions differ across the asynchronous and synchronous systems?
- How were the interactions different between high performing and low performing groups?
- In what ways did individuals of varying temperament types differ in the dialogic contributions they made towards task completion?

The second purpose of this study was to gain insights into student perceptions and attitudes towards the process of organizing, carrying out, and completing a project-based, collaborative learning activity. The primary question addressed here was, “What are student perceptions and attitudes towards participation in the completion of a project in a learning environment that utilizes CMC systems as a tool for collaboration?” The underlying questions that to explore this were:

- What preferences did the groups have for the different types of CMC systems?
- What differences existed in the perception of students about leadership and task distribution between high and low performing groups?
- What were the perceptions and attitudes of students concerning the collaborative project and what suggestions did they offer to improve the experience?

Significance of the Study

The results of this study offers significant contributions to the general precepts and theoretical body of knowledge concerning collaborative learning and the use of CMC systems as a vehicle for facilitating this process. A better understanding of the processes that occur in learning environments conducted online and that are collaborative in nature contributes to the body of knowledge that serves to inform educators in making decisions that encourage learning that prepares graduates for careers that increasingly require group efforts in arriving at solutions to everyday problems. A better understanding of what goes on in a computer supported collaborative learning (CSCL) environment offers instructors and instructional designers valuable information necessary for developing courses that incorporate the best practices and most effective instructional strategies for providing students with a rich collaborative online learning experience. This study also provides information that is useful to practitioners in the field as they decide (or are mandated) to integrate these technologies and methodologies into their teaching. The learning processes that take place in collaborative learning are complex and the more known about them the better instructors and students will be equipped to face problems and issues in the learning context of postsecondary education.

The model developed for this study to analyze the interactions that occur in online dialog, particularly in the realm of problem solving strategies, provides possible techniques for analysis that offers other researchers ways to study new technologies that influence the way students are involved in the learning process. This model provides a foundation that may be built upon by others in the study of online learning.

Limitations of the Study

The qualitative nature of this study lends itself to several limitations and possible threats to credibility and validity. Because the principle investigator was a participant observer in this study,

precautions were taken to maintain the integrity of the data collection and analysis of this data. In particular, a sample of the data was coded by another person to determine if there were any discrepancies in the interpretation of the interactions and collaborative processes that occurred.

A second limitation was the size of the sample. It would have been preferable to have access to a larger sample of students. This would have allowed a more diverse sample with students from a wider range of temperament types, experience levels in both collaborative learning and in using CMC, and in educational background, level and interests. However, this researcher's purpose was not necessarily to generalize to a larger population but to provide a rich description of a particular situation involving undergraduate students. The information derived from this investigation may be useful in future studies that are more valid and in which the interpretations may be applied to a broader range of subjects.

Definition of Terms

1. CMC Systems: Technologies developed to facilitate the online communication between individuals either in an asynchronous or synchronous environment.
2. Patterns of Usage: The number of times a group or participant accesses each component of the CMC systems. Peak times in which the CMC systems are accessed.
3. Interactions: The text-based dialog that occurred in the CMC systems through statements submitted by participants.
4. Project-Based Learning: Learning that involves student participation in the development of an informational Web site. Guidelines as to the components included in the Web site were given, however students were free to choose the content and were given creative freedom as to how this content was presented.

5. Asynchronous Communication: For the purposes of this study this mode of communication was available through a discussion forum in a designated private group area in the Blackboard environment.
6. Synchronous Communication: For the purposes of this study this mode of communication was available through a Virtual Classroom (chat system) in a designated private group area in the Blackboard environment.

CHAPTER 2 LITERATURE REVIEW

Introduction

The following review of literature will examine current theoretical aspects of collaborative learning, in particular those that are relevant to online learning environments, as well as, pertinent research to support these theories. To begin, an overview of recent calls for reform in postsecondary education and new paradigms for learning at these institutions will be given. An explanation of current theories that are pertinent to learning at the university level will be offered. Particular emphasis will be given to social and sociocultural constructivism and to a lesser degree the theories of situated learning and activity theory. The third major topic covered in this chapter will be the collaborative learning. Theoretical considerations of collaborative/cooperative learning and research that supports these theories will begin this discussion. Current research in collaborative learning in higher education will be presented and important factors that influence the success of collaborative learning will be given. Problem and project-based learning will follow with the description of the IDEAL problem solving model and factors that influence problem solving in groups. Next, a descriptive overview of computer-mediated communications will provide background and general information about this technology and how it has been integrated into educational settings. The analysis of CMC has lead to several models for determining the usage, interactions, and processes that occur in this environment and many are relevant to collaborative learning. These models will be described. Finally, research on the utilization and effectiveness of CMC in postsecondary education learning environments will conclude this review.

Reform in Postsecondary education: New Paradigms for Learning?

In the changing economy, managers and workers in the private sector must now “be cross-functional, cross-skilled, self-managed, able to communicate and work in teams, and be able to change on a moment’s notice.” (Klor de Alve, 2000, p. 35). This new economy and the way that communication can now be facilitated through the Internet requires that new workers have a thorough understanding of how they can use both asynchronous and synchronous computer-mediated communications (CMC) to carry out tasks and to be natural collaborators in reaching their work related goals. Postsecondary education must be at the forefront in preparing learners for the workforce. The challenge for postsecondary education is to get away from classrooms that are predominately teacher-centered and student-passive, to those that encourage interaction and discussion. This is an awesome task because it calls for faculty members to change their pedagogical leanings, students to rethink their epistemological beliefs, and requires institutions to invest in technologies that allow learning to occur beyond the walls of the classroom (Duderstadt, 1997; Frand, 2000; Pascarella & Terenzini, 1998; Prokasy, 1991).

A new breed of learner, the digital learner, is now entering colleges and universities and an understanding of the learning styles and learner characteristics of these students must be considered in the design and implementation of curricula that support these changes through an incorporation of discovery into student activities. We must teach students to be physicists, not just to knowledgeable about physics (Brown, 2000). Students must be engaged and active in their learning to acquire the skills necessary to cope with the new expectations facing them. This can only be achieved through a better understanding of the learning process. “Current, emerging, and as-yet-undreamed-of information technologies are forcing serious reconsideration of our assumptions of how, when, and where instruction (and education more broadly) can be delivered

and learning promoted.” (Pascarella & Terenzini, 1998, pp. 162-163). Munitz describes this new breed of learner:

These members of the “net generation” think of themselves more as producers of information and less as consumers of it. They are not content to assimilate information passively but are used to interaction with it, responding to it, and giving it new shape and meaning. They tend to be fiercely independent and yet socially aware and involved. They live in a fast-forward environment that gives profoundly different meaning to old phrases like “immediate gratification” and “low-attention span.” (Munitz, 2000: p. 17).

In their landmark treatise, the *Seven Principles for Good Practice in Undergraduate Education*, Chickering and Gamson (1987) analyzed decades of research and practice in post-secondary education and derived seven guidelines to promote reform in postsecondary education. Of these seven principles two are pertinent to this study. First, students should be encouraged to cooperate with other students and secondly, active learning should be integrated into the college learning experience. Students learn best when they work in teams as opposed to learning in isolation. To make learning a more valued and satisfying enterprise it is important to promote the development of learning communities. These communities should be environments in which students are actively involved in their learning. They should not be non-participants on the sideline, but should be engaged in communications with their teachers and fellow students and should be able to relate their learning to everyday experiences.

There have been some indications that these two principles have been accepted and have increased integration of collaboration and active student learning in universities have been observed but it is too early to tell if they have changed student behaviors or have produced significant improvements in learning. In a survey of students at 17 baccalaureate institutions and 22 doctoral-granting universities, conducted in 1990 and later in 1994, Kuh & Vesper (1997) found that although faculty are increasing their efforts to shift to a more student-centered environment in their courses, there is no indication that there have been positive outcomes in learning due to these

innovations. It was also found that between 1990 and 1995 student experiences with active and cooperative learning at graduate-granting institutions decreased significantly.

Although these principles have garnered wide support among postsecondary education practitioners and lead to many pedagogical innovations, "...there is little evidence that the changes add up to a systemic reconsideration of how and why students learn or of how institutions, rather than simply individual professors, can revise their approaches to teaching." (Lazerson, Wagener, & Shumanis, 2000). Attempts at reform have often been mired in political and institutional insistence on such things as "back-to-basics" movements that only reshuffle courses into "new" curriculums and do not encourage pedagogical change nor do they consider the learner as an individual in a community of learning (Spear, 1989). It is imperative that students are exposed to pedagogies that promote "communal learning and complex thinking" and student epistemologies are as important in the learning process as those of the teacher.

When students derive their ways (sic) knowing from their teachers' objectivist epistemology and conventional pedagogy, they view knowledge as certain, see the teacher as the authority, and define learning as individual mastery. Student involvement then becomes a matter of engaging with teachers and peers to demonstrate one's learning prowess or refusing to engage with others to avoid the competition. Students with this orientation are likely to resist – or at least feel confused by – new pedagogies based on mutual sharing, creative conflict, and consensus. Perhaps this explains the frustration many teachers encounter when they initiate classroom discussions, only to find that no meaningful exchange takes place. (Magolda, 1992, p. 267)

Kuh (1999) compared the quality of the undergraduate experience in the 1990s by analyzing data from the 1960s, 1970s, 1980s, and 1990s, addressing two important issues: 1) the gains of college students in their undergraduate experience and 2) the justification of calls for reform in the 1980s. He found that the majority of students surveyed stated that personal improvements occurred in "...intellectual and communication skills (synthesis, analysis, writing, self-directed learning), personal and social development (understanding self and others, being able

to function as a team member), and vocational training” (p. 111). At the same time, however, there has been a decrease in increased appreciation for the arts and sciences and students report that they devote less time to academic pursuits and to personal development and despite lower levels of effort report higher grades earned. The aforementioned gains do support the calls for reform initiated in the 1980s.

Looking at student appraisal of their undergraduate experience has revealed many insights into what they gain from their college experience. Another area that interests postsecondary education professionals is student persistence or the likelihood of a beginning student completing their desired degree program. There is a evidence to suggest that the more students interact in both social and academic environments, the more likely they are to persist (Pascarella & Terenzini, 1980; Rendon, 1994; Terenzini & Pascarella, 1977). It has been suggested that organizational reforms must be made in universities and colleges by establishing and supporting a community of learners in which both “shared knowledge” and “shared knowing” are integrated into curriculum. Shared knowledge requires that students take blocks of related courses together in which complex cognitive processes occur that may not be possible in disjointed courses. Students form communities of learners where they construct their own knowledge together with others, in ways that promote social and intellectual development (Tinto, 1998). There are advantages to these learning communities. First students form bonds that extend beyond the classroom and create social networks for support. Secondly, more active involvement in the classroom results both inside and outside normally scheduled class periods because students enjoy the learning experience when they work in teams. A third advantage to participating in learning communities is that students dedicate more time to learning and in so doing enhance their learning (Tinto, 1997; Tinto 1998).

Finally, some students experience what some refer to as “gaining a voice in the construction of knowledge” Finding themselves for the first time in a learning setting that requires their active involvement, they discover a ‘voice’ that they may not have previously recognized or had recognized by others. It is an experience, which in Rendon’s terms, validates their learning. (Tinto, 1998, p. 172).

The implementation of learning communities that promote active student involvement in their quest for knowledge requires that education professionals understand the theoretical underpinning of learning. The theoretical aspects of learning environments must be considered when implementing teaching strategies that support the reforms called for today.

Theoretical Aspects of Learning Environments

Since the turn of the century until now there have been numerous influences on teaching and learning that are derived from the theories of behavioral, cognitive, and social psychology. Behavioral and information processing models of learning have long been accepted in the instructional design community and have at their core, paradigms that suggest a mind-body dualism in which what goes on in the individual cognitive space is disjoint from what occurs in ones surroundings (Kirshner & Whitson, 1997; Lave, 1988). In contrast to these theories two constructs, social constructivism and situated learning, have emerged as alternative philosophies of teaching and learning and have at their core a fundamental belief that we learn by interacting with our environment and the communities that we learn in.

Cognitive models suggest that the learner is the central player in the learning process and that the human mind is a powerful information processing system despite the limited processing capabilities of attention and working memory (Bruning, 1994; Winn & Snyder, 1996). The brain is capable of receiving information, temporarily storing it, making sense of it, and retaining it for future use and availability. We can incorporate strategies into instructional methods that take advantage of our understanding of these processes (Smith & Ragan, 1999). It has been suggested

by Mayer (1996) that there are two views of the information processing model as it relates to learning. The first is a literal interpretation in which information is presented to the learner and this is then processed and stored for future retrieval. Information is atomistic, concrete, objective, and arbitrary. The second view of the constructivists suggests that memory representations are not simply information stored for future retrieval, but should be viewed as knowledge. Knowledge is schematic, general, mediated, and coherent.

Jonassen (1991) distinguishes between two philosophical paradigms of learning. The first is objectivism and is fundamental to behaviorist and information processing models of learning. In the objectivist framework of knowing:

Objectivism – the more common scientific conception of reality – holds that there is an objective reality that we as learners assimilate. The role of education is to help students learn about the real world. Students are not encouraged to make their own interpretations of what they perceive; it is the role of the teacher or the instruction to interpret events for them. Learners are told about the world and are expected to replicate its content and structure in their thinking. (Jonassen, 1991; p. 10).

On the other hand the constructivist viewpoint on learning takes on a more learner centered orientation.

Constructivism claims that reality is more in the mind of the knower, that the knower constructs a reality, or at least interprets it, based upon his or her apperceptions. The emphasis in objectivism is on the *object* of our knowing, whereas constructivism is concerned with how we *construct knowledge*...Constructivism does not preclude the existence of an external reality; it merely claims that each of us constructs our own reality through interpreting perceptual experiences of the external world. (Jonassen, 1991; p. 10).

Constructivism is a general term that encompasses several schools of thought. Modern versions, such as radical and information processing constructivism “...fits with the Piagetian or schema-driven brand of constructivism...According to this view, self organization is an inherent feature of the organism – a tendency most evident in the activity of the human mind.” (Prawat, 1996, p. 215). There are three postmodern constructivisms – the sociocultural, the symbolic

interactionalist, and social constructivism. Sociocultural and social constructivism are the two most relevant constructs to this study.

Social and Sociocultural Constructivism

Sociocultural constructivism derives its theoretical base in the writings of Lev Vygotsky (1978). Vygotsky, born in 1896, produced a substantial body of work (over 180 works) in his mere 38 years of life. His legacy and the ideas expressed in his socio-historical psychology live on through his followers and devotees (Blanck, 1990). Vygotsky was a pioneer in the development of the theoretical framework of mind and thought as the byproduct of social interactions and cultural influences. His philosophical perspective was one that rejected the mind-body dualism mentioned earlier in this section.

The sociocultural paradigm asserts that there is a relationship between social processes and the construction of knowledge. There are three premises to Vygotskian concepts of learning and mind (Wertsch, 1990). Higher mental processes are best developed in the social life of an individual. Our surroundings contribute to our mental growth. Secondly, the tools and signs (speech) used in ones everyday experiences serve as mediators in the development of these higher mental processes. Finally, the most effective way to analyze the social influences and these mediators is through genetic or developmental analysis. In this analytical method, learning and development are examined through careful observation of the social, cultural, and mediating forces that exist in the environment that surrounds the learner. Emphasis is placed on the historical changes that occur in the “context and opportunities for learning” (John-Steiner & Mahn, 1996, p. 194) and “process” takes precedence over “product” (Vygotsky, 1978) in understanding higher mental development.

Distinctions have been made between sociocultural and social constructivism in recent years, however they share similar traits. As in sociocultural constructivism, social constructivism is

a philosophical view in which the ways that we learn are deeply rooted in our surroundings and the social context in which this learning takes place. In general, constructivism has been characterized in terms of three propositions: “1) Understanding is in our interactions with the environment...2) Cognitive conflict or puzzlement is the stimulus for learning and determines the organization and nature of what is learned....3) Knowledge evolves through social negotiation and through the evaluation of the viability of individual understandings” (Savery & Duffy, 1995, p. ???).

Some social constructivists have criticized recent interpretations of Vygotsky’s original sociocultural theories concerning learning and knowledge acquisition. Cobb and Yackel (1996) characterize the Vygotskian framework “...as a transmission model through which students inherit the cultural meanings that constitute their intellectual bequest from prior generation (John-Steiner & Mahn, 1996, p. 196).” At the core of this argument is the interpretation of the concept of internalization.

Our concept of internalization recognizes unique human minds that owe their existence to and are inextricably intertwined with social, cultural, and material processes (including brain activities). Internalization is conceived of as a representational activity, a process that occurs simultaneously in social practice and in human brain/mind. Sociocultural researchers include the learners’ appropriation of socially elaborated symbol systems as a critical aspect of learning-driven development. (John-Steiner & Mahn, 1996; p. 196).

Situated Learning and Activity Theory

Two theoretical areas have gained considerable attention and support in recent years, situated cognition and activity theory. These disciplines take much from the sociocultural constructivist perspective (Brown, Collins, & Duguid, 1989; Kirshner & Whitson, 1997; Lave & Wenger, 1991). Borrowing also from anthropology, situated cognition theory is inspired by observations made of the ways in which normal people function in everyday natural situations. This theory has been contrasted with other cognitive science contentions. Situated cognition looks

at the social and environmental factors that contribute to the development of an individual, whereas more traditional cognitivist theories tend to focus on the individual. Much like proponents of Vygotsky's theories, situated cognition theorists consider activities and cultural tools to be the prime forces in the human development. The primary units of analysis in cognitive theory and situated cognition theory help one see the major differences between the two.

The critical strategic requirement for situated cognition theory is to shift the focus from the individual as the unit of analysis toward the sociocultural setting in which activities are embedded. Traditional cognitive psychology conceives of cognition intrapsychically. To the extent that social context is considered in such analysis, it must be decomposed into discrete facts or rules that can be entered into the individual's cognitive system...

Situated cognitivists have developed complementary means for breaking out of the focus on individuals: by focusing on the structures and interrelations within activity systems; and by linking the community of practice to broader categories of social and political analysis. (Kirshner & Whitson, 1997, p. 5-6).

Situated cognition has important implications for education and learning in both K-12 and postsecondary education applications. Situated cognition's socially oriented approach to knowledge and knowing is grounded in the assumption that the best way to develop both mentally, emotionally, and socially is through interaction with other persons, the mediating tools that one uses, and the artifacts that surround us in our everyday lives. This is best accomplished through an active, socially constructed environment.

The learners must be involved in their own learning and that of others around them. Wilson & Meyers (2000) suggest several principles that are relative to learning environments from a situated cognitive perspective. Learning is contextually based in that the situations in which learning occurs drive the process. Students are active participants in communities of practice (Barab & Duffy, 2000) that are "...powerful repositories and conveyors of meaning and serve to legitimate action. Communities construct and define appropriate discourse practices. (p. 71)." The learning environment is constructed with authentic activities in which students "participate in and

negotiate their way through new situations.” (p. 71). Language and culture comprise the tools and artifacts that are necessary for cognition to develop and “... embody the history of the culture. They enable thought and intellectual processes and constrain or limit that thought.” (p. 71). Rules, norms, and beliefs are founded on the norms of a society and represent the belief system of the culture and determine how cognitive tools are to be utilized. Situations are embedded in the historical attributes of the community of practice. The interplay between the learning situation and individual is reciprocal with each having an influence on how the other is shaped. Finally, “People’s notion of self – of continuing identity, separate from others yet belonging to various groups – is a constructed artifact with many uses.” (p. 71). The assumptions of the situated cognitive perspective are important in developing learning that is relevant and useful to students and that will have lasting effects on their future endeavors. By making them participants in their own learning we make this possible.

The situative perspectives can provide a broader framework for understanding and improving educational practice, which can include the important aspects of individual cognitive functioning, but can also go beyond them. As we develop more adequate concepts about systems in which individuals participate, along with other people and with material, representational, and conceptual resources, and develop their identities as contributors and learners along trajectories of participation, we can contribute to the public discussion of educational practices more effectively...We can work toward developing the arrangements for this broader range of participation by students so they can understand that the skills and knowledge they are acquiring have significance for the contributions to the communities in which they participate at present and in the future, and that their learning in school is an integral part of their development as successful and productive individual agents and learners. (Greeno, 1997).

The encouragement of students to participate in learning communities is grounded in teaching them to learn collaboratively and in order for educators to implement this into their teaching strategies they must understand the basic premises of collaborative learning theories.

Collaborative Learning

Collaboration by its very nature requires that learners be actively involved in a community in which they interact with others and utilize the tools and artifacts available to accomplish the goals and objectives of the group. The next section will distinguish the differences between cooperative and collaborative learning and a discussion of the implications of these types of teaching strategies in post-secondary learning environments will follow. This will include an explanation of the theoretical assumptions that can be made about collaboration in the university and then a review of research conducted on the effectiveness of this method of instruction will be introduced.

Collaborative versus Cooperative Learning

There has been much discussion concerning cooperative and collaborative learning and although they are often considered one in the same, there are differences that must be noted. Slavin (1995) refers to cooperative learning as "...a variety of teaching methods in which students work in small groups to help one another learn academic content. In cooperative classrooms, students are expected to help each other, to discuss and argue with each other, to assess each other's current knowledge and fill in gaps in each others' understanding." (p. 2). Cooperative learning can be characterized by activities in which group goals are established, each individual is accountable for his/her work, all group members have an equal opportunity to succeed, there is competition between teams, each group member has a task to accomplish, and instruction is adapted to meet individual needs (Brody, 1995). Cooperative learning has been depicted as highly structured group work (Davidson & Worsham, 1992), which provides methods of instruction that support the development of social skills and the meeting of content objectives (Presseisen, 1992) that depends on "contextual influences and on how people respond to those influences " (Jacob, 1999: p. 147).

Collaborative learning, on the other hand, is usually considered less structured and students have more influence on the scope and outcomes of the learning process. Students define their own learning needs and in turn “...take responsibility for identifying both what they feel they need to learn and how they will learn it, in contrast to cooperative learning in which the teacher has the responsibility for determining what will be learned.” (Caplow & Kardash, 1995, p 208). Collaborative learning “has a particular epistemological orientation called social constructivism that distinguishes it from other forms of group work and creates the large frame for assessing the nature and purposes of classroom discourse.” (Brody, 1995: p. 135). When students collaborate they interact in socially accepted ways and converse among themselves to reach goals through consensus arrived at by the group (Gerlach, 1994). Gerlach suggests six characteristics of collaborative learning activities.

First, they allow time for group consensus to occur. Second they ask students to complete specific tasks within a given amount of time. Third, they allow the members of groups to negotiate individual diversity and minority views. Fifth, they allow students and teachers to collaborate once group consensus has been reached. Sixth, they ask both students and teacher to evaluate the collaborative process as having been effective or ineffective. (Gerlag, p. 12).

A group of experts in the field of telematics (the use of computers and networks in support of collaborative learning) convened for a workshop in 1989 to discuss ways that computer conferencing might be used in distance education, adult learning, professional training, and organizational networking (Kaye, 1991). A product of this meeting was a comprehensive six element definition of collaborative learning. Learning is individualistic in nature and although not usually a collective process it is often influenced but external factors such as group and interpersonal interactions. Learning is “simultaneously a private and a social phenomenon (Kaye, 1991, p. 4)” and dependent on language. A collaborative learning environment fosters the exchange of ideas, equality in the interactions that take place, and flexibility of the roles that

members take on to reach the goals of the group. Collaboration in the learning process is potentially superior to learning individually, however it is important to note that this does not necessarily mean that success will always occur. This method of learning is not limited to learning in a group, but may simply serve as a support mechanism in a non-competitive fashion. This definition of collaborative learning focuses on the learning process where the previous description focuses on the group processes that are involved in learning.

Bruffee (1999) notes that collaborative learning and cooperative learning are basically one in the same. The difference is in how goals are attained and how group members reach consensus. He believes that true cooperative learning is best suited in elementary grades and as students mature they become proficient collaborators who can take a more direct role in constructing their own knowledge. If we accept Bruffee's implied assumption that collaborative learning is best suited for learning at the university level then it is important that we understand further how the two differ. According to Bruffee, collaborative learning "undercuts" cooperative learning in "its goal of ensuring accountability" (p. 90). First, students are not assigned roles to insure equal and full participation in a collaborative learning environment. It is up to the group to determine what the roles are and who fulfills those roles. Secondly, teachers should not interfere in group affairs. Groups should be responsible for resolving ambiguities and questions. The third thing that distinguishes cooperative learning and the collaborative process is that group processes should not be evaluated as they are in typical cooperative settings. This removes the competition between individuals and creates it between groups creating a sense of teamwork.. Finally, collaborative learning encourages "disagreement" and "content". In order to attain consensus, collaborative learning provides a vehicle for students to resolve issues that may arise that are conflictive in

nature. This process goes far in producing quality results or in providing the best possible outcomes for the learning activity.

Research in Postsecondary Collaborative Learning

In postsecondary education there is a growing movement to supplant the conventional pedagogies in which instructors are the primary source of knowledge and students are merely receptacles for information and in order to be successful they must be able to “reproduce and manipulate that knowledge” (Magolda, 1992, p. 266).

If we are to create a pedagogy that promotes communal learning and complex thinking, then we must not only deal with the teachers’ epistemologies but also with those of the students...When students derive their ways of knowing from their teachers’ objectivist epistemology and conventional pedagogy, they view knowledge as certain, see the teacher as the authority, and define learning as individual mastery. Student involvement then becomes a matter of engaging with teachers and peers to demonstrate one’s learning prowess or refusing to engage with others to avoid the competition. Students with this orientation are likely to resist – or at least feel confused by – new pedagogies based on mutual sharing, creative conflict, and consensus. Perhaps this explains the frustration many teachers encounter when they initiate classroom discussion, only to find that no meaningful exchange takes place (Magolda, 1992, p. 267)

Colleges and university classrooms practices are grounded in what Bruffee (1999) calls “foundational assumptions” in which professors are authorities whose primary responsibility is to “...transfer the knowledge in their care from their own, fuller mental vessel to the empty vessels of their students. Professors impart knowledge that was imparted to them, in the same way that it was imparted to them.” (Bruffee, 1999, p. 63). It is this adherence to these foundational assumptions that has thwarted research on collaborative learning in college and university settings. Most research approaches collaborative learning as only a method that really has no effect on what students learn. Bruffee suggests that research in collaborative learning must take on nonfoundational assumptions that looks at students ability to make “reliable judgments independently” and at the ways that collaborative learning helps them reach that goal. He also

suggests that it is important to know how the collaborative processes transfer to other contexts. Another pertinent question that might be asked is, “Do students learn something about how human beings construct knowledge together, in classrooms and out, when they work interdependently on substantive issues?” (Brufee, 1999, p. 265).

Despite a paucity of research in collaborative learning at the university level, a few notable studies have been conducted. In a meta-analysis of research from 1980-1998 that included undergraduates in science, mathematics, engineering, or technology courses or degree programs in which small-group work was incorporated both inside and outside the classroom, Springer, Stanne, and Donovan (1999) concluded that small-group learning is an effective method of instruction. There seems to be greater achievement, favorable attitudes towards learning, and less attrition than in courses that are taught in more traditional pedagogies. In a literature review of cooperative learning in postsecondary education, several studies from the 1980’s were cited indicating positive effects in achievement and attitude when using cooperative learning strategies with college students (Cook, 1991).

Research has shown that the use of cooperative learning strategies in the college classroom has been found to be an effective teaching strategy. Gains in student performance, class attendance, and student satisfaction were found in large classrooms of up to 180 students in both the physical and social sciences in which the instructor utilized cooperative strategies in their instructional practices (Michaelson, 1983). Improvements in metacognitive strategies were noted in an engineering class that worked in small groups to solve mathematical problems (Smith, 1987). In a study that compared English classes taught in a traditional manner versus those taught using small cooperative groups it was found that cooperative learning was more effective, more was learned, strategies used in cooperative learning transferred to individual situations, and higher ability

students were important in helping lower ability students (Dansereau, 1983). More recent research has indicated these same results. Cooperative learning using “Peer Learning Assistants” in an introductory biology class was found to elevate group performance and to develop positive attitudes towards the group experience (Groccia & Miller, 1996). Students engaged in developing mathematical proofs in collaborative groups were found to be enthusiastic and more persistent in their efforts and also provided the instructor with a better idea of the progress of individuals and the make-up of the class (Alexander & DeAlba, 1997).

In a qualitative study that looked at two graduate-level courses using a “highly collaborative model” suggested by Tracy and Shuttentbert (1986) to explore topics in-depth, Caplow & Kardash (1995) provide four suggestions for faculty in implementing collaborative group instruction. The “highly collaborative model” is one in which the learner is responsible for what is to be learned and how that learning will be accomplished compared to “non-collaborative” learning where the teacher is responsible for this. They first suggest that instructors provide a clear rationale for using this form of activity. It was also suggested that a balance should be established between the process and the product of the collaborative activity. Their next suggestion was for the instructor to monitor the progress of the project and to be flexible enough to make changes if was deemed necessary. Finally, Caplow & Kardash suggest that evaluation procedures must be specified, preferably on the course syllabus. This is contradictory to the idea that students in a highly collaborative model have total control of their learning. Caplow & Kardash (1995) suggest that “...faculty should communicate with the groups as they are defining their task regarding what should be evaluated in relation to that task and how it should be evaluated. In so doing, the instructor then has the opportunity to discuss evaluation techniques with the group (p. 220). These

suggestions imply that the role of the instructor is not necessarily diminished, even in a highly collaborative environment.

College students are often lacking in the skills necessary because they come from competitive environments that are not conducive to collaboration and cooperation between peers (Bosworth, 1994). This may very well lead to resistance to collaboration because they often lack the appropriate skills that one needs to be effective in collaborating with others (Schultz, 1990). Bosworth (1994) suggests a taxonomy of skills that are important in the collaboration that occurs among college students. These fall under five broad categories including interpersonal skills, group building/management, inquiry skills, conflict, and presentation.

Interpersonal skills are those that reflect the basic social skills that college students have assimilated through past experiences with friends and family. Rapport between group members is established only if these skills are present. These skills help to “break the ice”, so to speak. The next skill level in Bosworth’s revolves around organization skills such as staying on task, the ability to establish leadership roles, self-analysis of the group, and an ability to show empathy towards other group members. These roles are usually the responsibility of the instructor in a traditional classroom, where as, in a collaborative scenario students take on the role of managing their learning environment. This skill is imperative for the group to be able to resolve conflicts and come to a consensus during the process. Once group members have established a rapport and have agreed on the logistics of the process it is necessary for them to develop the inquiry skills needed to locate, analyze, synthesize, and evaluate information that is vital to the project. This is not unique to the collaborative process. It is, however, vital to a successful collaborative learning experience. Conflicts will inevitably arise after all information has been collected, analyzed, synthesized, and evaluated. Whether they be personal, intellectual, or procedural, it is impossible to arrive at a

quality collaborative experience and product if group members do not have the skills to resolve their differences. The final skill level is the ability to synthesis all of the information collected into a presentable, quality product. “An effective presentation requires group members to agree on an appropriate approach, carry through with it, and bring it to closure.” (Bosworth, 1994, p.28). These skills are not mutually exclusive. They overlap and build upon each other. There is, however, somewhat of a building effect as one progresses through the collaborative process. For a summary of the Bosworth taxonomy see Table 1.

Table 1

Bosworth’s Taxonomy of Collaborative Skills for College Students adapted from (Bosworth, 1994).

Skills Category	Collaborative Skills
<ul style="list-style-type: none"> Interpersonal Skills 	Give constructive rather than destructive feedback. Respond to others ideas not just the person. Abstain from put-downs and derogatory comments. Make clear statements in your discussion.
<ul style="list-style-type: none"> Group Building/Management Skills 	Make and follow an agenda. Keep on task. Complete tasks by deadlines. Show empathy with the needs and problems of fellow group members. Discuss feelings about the group and the process.
<ul style="list-style-type: none"> Inquiry Skills 	Ask other group members for clarification of vague issues. Don’t hesitate to give constructive criticism and be willing to accept it when offered. Probe assumptions made by your group. Probe implications and consequences of individual and group decisions. Elicit viewpoints and perspectives of fellow group members.
<ul style="list-style-type: none"> Conflict Resolution Skills 	Discuss ways of preventing conflicts before they arise. Work together and diplomatically to resolve conflicts that may occur. Seek intervention (from the instructor) when these conflicts cannot be resolved.

Another factor that may be important in effective collaboration is the compatibility of personalities of group members. The skills mentioned above may very well be dependent on the personality of individuals. For example those who tend to be more authoritative might take on a

leadership role and might be instrumental in group building. A person who tends to be more idealistic might be beneficial to the group in conflict resolution and those that are artistic might stand out in interpersonal skills. Overall research shows that personality may very well be a contributing factor in how groups function.

Groups composed of individuals whose personality traits enable them to take initiative, act independently, and act compatibly with other members will be more productive. When possible, group members will develop a group structure that is compatible with their personalities. For example members who value authority will create a bureaucratic structure and those who value intimate relations will create a collaborative structure (Friedlander & Green, 1977). When a structure is imposed on a group, productivity will be higher when the structure fits the personality characteristics. (Hare, 1992, p. 34).

Problem/Project Based Learning

One instructional technique implemented by instructors at the collegiate level that often uses collaborative learning as a component and that has garnered recent attention in the literature is problem-based and project-based learning (PBL). Dougherty & Fantaske (1996) define problem solving as follows: “A problem exists when an individual must complete a task but does not possess sufficient knowledge or experience to reach an appropriate solution.” (p. 56). Constructivist learning requires that students learn in ways that often involve ill-structured problems that have no right or wrong solution.

There is a substantial body of research on how individuals and groups solve problems in a variety of educational settings. From the pioneering work of Polya (1957), Wertheimer (1959), and Newel & Simon (1972) models have been developed that attempt to explain how individuals solve problems. One such model that has been widely accepted is the IDEAL model for improving problem solving skills proposed by Bransford & Stein (1993). The basic premise of this model is to identify the basic components of the process of the problem solving process. In their model they

consider five primary such components: Identify problems and opportunities; Define goals; Explore possible strategies; Anticipate outcomes and Act; and Look back and Learn.

The first process in becoming a successful problem solver is to be able to seek out new and challenging problems by looking past barriers that may prevent immediate solutions to everyday situations. This identification stage is fundamental to getting past initial roadblocks that may hinder or enable one to begin the other stages of problem solving that follow this initial one. This requires that one seek out new problems that offer one opportunities for improvement. Failure in problem solving is often the result of one not taking the time to stop and think about possibilities that might improve on what already exists.

Once a problem has been identified it is important to carefully consider the problem and to define the goals that will facilitate a successful solution. The goals that are developed are often reflective of how one might approach the solution to a problem and this may have profound effects on the success of the individual in developing further strategies that lead to the opportunity for improvement that has been identified in the first stage. One determining factor that often prevents successful problem solving is that one does not consider alternative goals that may lead to strategies that will allow a problem to be solved. Barriers that prevent adequate solutions to problems are often rooted in the failure of one to define goals and to immediately jump into the next phase of problem solving, exploring strategies.

In the next stage of problems solving one explores possible strategies based on the goals established in the previous goal setting component. If one successfully defines alternative goals in step two then they can then begin to explore possible ways to approach the problem and may also require a reanalysis of the goals and to make revisions if necessary. Bransford and Stein (1993) suggest several general strategies such as systematic analysis, breaking a problem into parts, using

external representations, working problems backwards, and focusing on a simplified problem that is similar to a more complex one. Being a successful problem solver is not solely dependent on having the ability to apply these general strategies. Often one must have a thorough understanding of concepts that are important to understanding the problem at hand and may have to be skilled at strategies that are content specific in order to continue to the next stages of problem solution. Once strategies are decided on it is time to proceed to the next component of the problem solving process where one anticipates possible outcomes and acts on these strategies.

In this next phase of problem solving, one thinks ahead and tries to determine possible consequences, barriers, and obstacles that may hinder their efforts. They try to foresee what will happen when they implement their strategies before they actually act on those strategies. This process can save much frustration and potential disaster if one identifies possible flaws in the strategies one has decided on. Once a set of strategies is determined that seems to lead in the right direction, it is time to act on these strategies and implement them in an attempt to resolve the problem. Anticipating possible outcomes may not always be the first thing one does in the anticipate and act component of problem solving. One might have to actually act on a strategy to anticipate possible outcomes. Bransford and Stein (1993) use the development of prototypes as one example of when one might act on a strategy before they anticipate outcomes. When one has anticipated and acted on strategies and these strategies lead to possible problem solutions it is time to reflect on the implementation of the strategies by looking at the effects of the applying the strategies and then learning from the experience.

Intuitively, the final component of the problem solving process as suggested by Bransford and Stein (1993) appears to be an obvious final stage. However, they state that in their research they often find that students quite often stop at the anticipation and acting component and fail to

look back and learn from their experiences in solving a problem. They do not look at their performance and fail to learn from their successes or failures. When one fails to do this they also often do not see possible flaws in their solutions or may miss out on realizing other possible strategies that improve on their previous solutions. By looking back on their experiences they may see generalizations that can be made to future problems and that improve on their overall abilities as problems solvers. The IDEAL model is not always a linear process and actually should be considered cyclic in that it is often necessary to look back and possibly reenter different stages to redefine and improve on previous attempts at problem solution. This last component is often where one sees the need to do this.

The IDEAL model is not only specific to individual problem solving activities, but can also be applied to problem solving in the context of groups. There have been numerous models of problems solving for various types of group settings that utilize the scientific method of problem solving to approach the development of ideas, methods, or products (Hare, 1992). Several suggestions of the processes that are used by groups to solve problems have been identified in the literature concerning team-building. In general groups go through phases of development, in which they define a situation, acquire resources, develop roles of individual group members, coordinate tasks, and finally come to some type of closure on their activities a series. Team development programs have been developed that approach group development of phases including startup, problem solving and process analysis, interpersonal and group feedback action, planning, and follow-up (Dyer, 1987).

There is a substantial body of research that is concerned with the differences that exist between individual and group problem solving. The general consensus concerning most tasks related to group problem solving is that individuals first act in isolation and then come together to

share or combine their products with other members of the group and to arrive at a solution. Indeed one determinant of how well individuals compare to groups in arriving at an adequate problem solution is the task's solvability in isolation versus collectively (Hare, 1992). The presence of others may be detrimental or beneficial in the performance of an individual depending on the complexity of the task (Zajonc, 1965) or the expertise of the individual (Hill, 1982). In easier tasks individuals perform at a high level and as the problem becomes complex this seems to deteriorate due to the combination of the task and to the distractions that the presence of others provides. The interactions that occur, be they interfering or supporting, are the primary determinant in how well individuals perform in groups. However, when problem tasks require high levels of creativity groups often outperform individuals, particularly if there is one or more individuals in the group that are proficient problem solvers (Laughlin & Fultron, 1985).

When comparing groups in their performance in problem solving activities, several factors contribute to the superiority of one over the other.

Productive groups have a commitment to a clear goal and a combination of member's personalities and skills, type of group structure, role assignment, morale, and problem-solving experience that are appropriate for the task (McGrath, 1984). Although competition between members may result in higher total output, there is usually a cost in terms of low member satisfaction. However if the group members are interdependent and some cooperation is necessary, then competition will lower efficiency (Rosenbaum, Moore, Cotton, Hieser, Shover & Gray, 1980). (Hare, 1992, p. 34).

Bransford and Stein (1993) offer several possible instructional application of their IDEAL model, one being project-based instruction. Student projects offer an idea situation to provide problem solving opportunities that present real world problems that are scaled back so that they are doable in the confines of the classroom. Project-based learning can be thought of as learning through a series of theme related activities that are based in authentic, real-world problems in which the learner has a certain amount of control over the learning environment and the design of

the learning activities (Morgan, 1987; Slavin, 1995). The concept of project-centered activities has been addressed in both organizational and educational contexts.

In the literature on education a project is usually regarded as a means of bringing meaning to a range of activities by relating them to a certain theme (cf. Morgan, 1987). The theme, or a certain problem to be solved, is central to the project because it structures the activities that are undertaken in a non-linear way. That is, the theme or problem is gradually explored from different perspectives. Each activity leads to a new activity which was not necessarily pre-planned. Project members adjust their goals and methods to new insights gathered during the project. This approach emphasizes the content dimension of the project (activities, intentions, strategies), rather than its conditions. (Poell, Van Der Krogt, & Wildemeersch, 1998, p. 342).

Problem and Project-based learning and collaborative learning are highly compatible and in a way are essential to each other for effective implementation into the university classroom. Incorporating these types of learning activities into everyday teaching strategies poses a challenge on both the instructor and students. The high time demands placed on both teachers and students may be confounded if projects that are collaborative in nature are introduced in addition to regularly scheduled classroom tasks. Meeting outside of class to work on these projects and instructor facilitation and encouragement of student involvement requires additional time that may not be available to all parties. To make it easier for students to collaborate and for instructors to monitor collaborative projects it may be beneficial to incorporate new technologies such as computer-mediated communications (CMC) as a tool for meeting in groups in ways that are not normally possible. The next section of this review will provide an overview of CMC and its implications in educational settings.

Computer-Mediated-Communications (CMC)

To better understand CMC it is important that one understands its background and how it is utilized in educational settings. In addition to this background information and for the purposes of this study, some understanding of how CMC has been analyzed in the context of learning

environments may also help to clarify how it has been used. Finally, several studies have been conducted in which college students have utilized these systems in their learning.

Background and CMC Systems

Computer-mediated communication (CMC), “involves the exchange, or sharing of information among individuals via the medium of a computer that is connected either to an internal network (an intranet) – or a global network such as the Internet.” (Harris, 1999). It can take several forms: electronic mail; mailing lists; UseNet groups; and computer conferencing. Electronic mail, better known as e-mail. Allows one to send a messages to individuals or to a group of individuals and in some cases allows one to send an attached digital files of various formats (graphics, text, program files). Mailing lists, commonly known as listservs, is an extension of e-mail that allows topics of discussion to be posted and forwarded to other members of the list via their e-mail address. There is usually no method of sorting and archiving messages within the system itself. A third form of CMC consists of what has been called UseNet groups. These are the newsgroups that are common components of most Internet providers and organizations. This is an open forum that allows participants to post a message to the group and others to respond. UseNets go one step beyond listservs in that they allow the end user to sort messages into categories. Harris (1999) also classifies video-conferencing, in particular PC-based video-conferencing as a form of CMC. This is a relatively new technology and the quality of the video transmission usually produces jerky motion and unsynchronized video and audio. As the quality of this medium improves it may become more widely accepted as a mode of communication. Another form of video transmission is in the form of video streaming in which video is transmitted through the Internet utilizing technology that allows for faster access to video files.

The final form of CMC is computer conferencing, and is central to this study. Computer conferencing allows a many-to-many way of exchanging messages and for working collaboratively

via electronic means. These messages can be categorized and stored under different topics so that more than one forum can occur at one time on the system. There are two types of computer conferencing: asynchronous and synchronous. Asynchronous conferencing allows forums to be introduced and participants to respond to these forums. One responds by either creating a new thread (an initial response to a forum topic) or by responding to threads that have already been posted. Interaction is time and place independent in this form of CMC (Harasim, 1990), meaning that a respondent may post a message and it is stored on the conference server for others to review and respond to at a time and place that is convenient. A relatively new form of conferencing has recently found a niche in educational circles. This mode of communications is synchronous, which means that interactions occur in real time with respondents exchanging dialog much like they would in normal conversation. Users log into a “room” and a screen appears with the ongoing “chatting” of others scrolling up the screen. To contribute to the discussion one simply types into a dialog box and submits what it is they want to “say”.

CMC has been evolving since the late 1960’s. Computer conferencing was first introduced by Murray Turoff in 1970 to provide an environment for intellectual community for information exchange and effectual problem solving (Hiltz and Turoff, 1978). Computer conferencing has established a place in government, corporate, and scientific circles and is becoming quite prevalent in the lives of private citizens. One need only log on to their Internet provider and click on a couple of links to be in a discussion group or chat room. Computer conferencing found its way into educational communities and pedagogies in the early to mid eighties (Harasim, 1990). Most all products today that are geared towards aiding instructors with supplementing or creating Web environments for their courses contain some form of conferencing.

The adaptation of asynchronous communication to the Seven Principles for Good Practice in Undergraduate (Chickering & Gamson, 1987; Chickering & Reisser, 1996) has been suggested by DeBard and Guidera (1999-2000). “Facilitating class discussion while encouraging students to reflect with the accountability of a posting on an on-line forum, electronic bulletin board, or list serve email message encourages active learning as well as collaboration in formulating the best collective response for class consideration (DeBard and Guidera 1999-2000, p. 223).” They suggest that asynchronous communications is a natural means of facilitating collaboration among groups. It has been suggested that the anytime, anyplace nature of asynchronous communications can facilitate group projects because it does not require students to meet in person at specified times, thus not conflicting with other commitments and responsibilities (Anderson, 1997).

CMC in Postsecondary Learning Environments

Several advantages have been suggested for using CMC as a supplement to traditional lecture based instructional techniques (McComb, 1994). CMC extends learning beyond the four walls of the classroom allowing dialog to continue beyond normally scheduled class times. Secondly, CMC bridges barriers that are often created because of inequities in the balance of power that normally exists in the typical college classroom. Instructors and learners should be engaged in the learning process and the focus no longer should be limited to lecture and the knowledge of the instructor. Instead, emphasis is on the process of mutually shared learning. “CMC inherently puts teachers and students on a more equal basis, because all participants have identical access to and control of the CMC environment. Students can initiate communication without waiting for the instructor’s recognition and can direct messages at each other rather than addressing the instructor.” (McComb, 1994: p. 165). A third and final advantage is that CMC is efficient in providing easy access to resources, facilitating of assignment turnaround, simplifying

record keeping, and increasing the ability to focus participation. In short, CMC alleviates the tremendous amount of paperwork and paper waste that is often seen on university campuses.

Several studies have compared traditional face-to-face learning and that of learning through CMC. Hiltz (1997) found that mastery of undergraduate course materials delivered via video conferencing and through a “virtual classroom” in an online degree program was equal to and perhaps even superior to traditional methods. Students in virtual classrooms report higher levels of satisfaction and those involved in group learning tend to have more positive learning outcomes. The use of computer supported collaborative learning in large university lecture classes has been found to be both more efficient and effective than face-to-face learning when one is more interested in the quality of the end product and the amount of learning that takes place (Benbunan-Fich & Hiltz, 1999; Thoennessen, Kashy, Tsai, & Davis, 1999).

In another study comparing online with face-to-face instruction in two versions of a graduate level course at a large Midwestern university, it was found that there were indications of higher satisfaction among students in the face-to-face mode of instruction, but that there were no significant differences in the quality of learning that occurred (Johnson, Aragon, Shaik, & Palma-Rivas, 2000). Face-to-face students had more positive reactions to the characteristics of their learning environment than those in the online environment suggesting that the lack of social interaction may inhibit online students. There may be two reasons for these discrepancies. First, online students do not have the daily interaction with other students leaving them disconnected from the day-to-day classroom environment. Secondly, early experiences in their schooling may influence the online students’ expectations with regard to student progress and instruction interaction.

Bures, Abrami, and Amundsen (2000) conducted a study that examined student satisfaction and frequency of online participation in relation to perceived outcome expectations of success, motivation to learn, and whether or not the activity was required in the grading of the course. They looked at four graduate-level educational technology face-to-face courses and one undergraduate distance education course, all of which integrated conferencing for small group discussions. They found that students' outcome expectations were correlated with their participation in the non-graded discussions. Student apprehension to CMC is detrimental to learning how to use online communications and leads to decreased participation in graded activities. They concluded that participation in online activities may be related to whether or not it is graded or not and despite previous research findings prior experience in using CMC had little effect on success or outcome expectations. They contribute this to the user-friendliness of the conferencing software.

In a controlled classroom experiment in which two halves of a graduate level seminar were conducted using either face-to-face discussions or using a computer conferencing system, Newman, Johnson, Cochrane, & Webb (1996) found that critical thinking ratios were substantially increased in the latter environment. The authors concede that in their experiences most discussions "degenerate into monologues", and that very little critical thinking emerges in face-to-face discussions or those supported by computer discussion groups. A content analysis of transcripts of both face-to-face meetings and online discussions was conducted and students were given a questionnaire at the end of the semester. The analyses explored the depth of critical thinking that was attained by looking at various stages that one goes through in this process. It was found that although there was less said, there was a greater degree of overall critical thinking in the CMC environment than the fact-to-face seminars.

Dobos (1996) investigated the effects of student expectations and communication apprehension on student motivation in both online and face-to-face collaborative learning environments. Students with high expectations for the collaborative activity and low communication apprehension were compared with students with low expectations and high communication apprehension. On three collaborative modalities: 1) interactive computer-mediated communications; 2) face-to-face group discussion; and 3) peer writing critiques quantitative results indicated that several theoretical and practical implications were possible. The most notable was that, "...it is apparent that the conceptualization of emergent motivation as a multiple set of intrinsic rewards successfully accounts for the ways in which students differ in their perceptions of expected task challenge and communication apprehension concerned with various collaborative learning modalities." (p. 131). Instructors may not want to rely on one modality of collaborative learning and might consider giving students more control over what modalities they chose and the tasks they under take. They may find one modality less intimidating than the others. Their findings also suggest that some times should be spent on developing sound group processes.

In a study exploring the use of CMC as a way to bridge the gap between students in large lecture classes and to promote meaningful discussion, Chong (1998) used a multi-sample case study approach to analyze methods that instructors used in an asynchronous conferencing system. Interviews, observations, questionnaires, and document analysis were all used to collect data for this study. It was found that three basic models were used by the instructors: 1) ongoing electronic discussions; 2) case study analysis; and 3) collaborative test preparation and assessment of student learning. In one variation of ongoing electronic discussions in which debate issues were posted to a discussion forum to supplement topics that were brought up in lectures, it was found that CMC did not effectively enhance collaborative learning. It was found that these mostly undergraduate

students still perceived the instructor as the authoritative figure that they are accustomed to and preferred feedback from them rather than their peers. In another variation of this model, the instructor placed more emphasis on real world collaborative work approaches. The instructor took a hands-off approach to the online deliberations and did not interfere in student dialog. It was found that these online activities provided a way to extend in-class discussions effectively and to give students time to reflect on how issues were relevant to their own experiences. Despite these enhancements there were still negative reactions by several students in the class. Some found this means of exchanging ideas as being unproductive and felt that the method of awarding points for participation to be inappropriate. Chong attributes this to newness of the medium and the lack of access to computers by many of the students. Overall, it was concluded that computer conferencing can be a conduit to increased student involvement in large classes. It can help to reduce feeling of anonymity and contribute to a sense of community among students.

A study was conducted in which students were required to complete a semester long final project using collaborative techniques that are prevalent in corporate work environments (McComb, 1993). Students completed phases of the project as the semester progressed with the instructor providing feedback and suggestions for improvement. The instructor acted as a supervisor, consultant, coach and evaluator throughout the entire project. There were infrequent class meetings and students were expected to work independently to attain the final goal much like teams work in the corporate world. To aid students in the collaborative process, a private e-mail facility and online "file cabinet" for storing mail and course materials and a class bulletin board were provided. In a survey administered at the end of the course students responded favorably to the interactions that were possible with the instructor. They were not as enthusiastic about the potential benefits for student-student interaction. McComb recognizes the advantages of CMC to

the instructor and suggests that students' hesitance to acknowledge these potential benefits is probably due to limited exposure to the tool.

In a study of CAMILE, an asynchronous learning network, it was found that communication in this context is useful but only in certain educational contexts where collaboration is the primary goal. In particular they noted that, "CAMILE is asynchronous and may not be appropriate for negotiation of difficult issues that require rapid turns at talk and shared access to objects that cannot easily be referred to in the electronic space." (Hemlo, Buzdial, and Turns, 1998, p.124). They found that instructor participation and support is vital in sustaining quality, focused discussion in this environment. They refer to their methods as anchored collaboration where students' online discussions are best facilitated when scaffold in such a way that students are guided as to when they should communicate, what to talk about, and the importance of their participation. Anchors are provided to the discussion space by the instructor and "...provide a logical connection between student activities and conceptual topics (Hemlo, Buzdial, & Turns, p. 125)."

A multi-study research project to address several propositions and hypotheses related to collaboration and asynchronous learning networks (ALNs) was conducted by Hiltz et al (2000). Three longitudinal studies (a field study of ALN, a field experiment on collaborative learning, and semi-structured interviews with faculty) focused on 26 courses offered as part of an undergraduate degree program in Information Systems and compared courses conducted online and those taught in a traditional face-to-face classroom. Using a variety of quantitative and qualitative methodologies they found that ALNs give students greater access to educational opportunities, degree completion may be expedited, there are gains in the quality of learning, and students perform better on course assessments. They also found that the quality of learning is dependent on

active student participation, properly implemented pedagogical strategies, and that, collaborative assignments has an effect on student motivation in a positive way.

Interactions within Collaborative Learning Environments

An important aspect of learning, particularly in collaborative learning environment is the interactions that take place between other learners and the course content. The latter interactions can be characterized as the process by which students interact with the materials of the course to “construct knowledge through a process of personally accommodating information into previously existing cognitive structures.” (Moore & Kearsley, 1996: p. 128). In student-student interactions learners communicate and take part in discourse without the presence of the instructor to improve cooperative/collaborative learning techniques, to create opportunities for group projects that can be presented to their peers, and to conduct “inter-learner” discussions. The analysis of CMC conversations has challenged a number of researchers to come up with models for the interactions that occur during online communications.

Hiltz (1990) proposed a series of eleven hypotheses using quantitative data collection and analysis strategies. Surveys, questionnaires, automatic auditing of use, institutional data, feedback from faculty, interviews with students, and content analysis were all a part of the suggestions that Hiltz made on possible tools for analyzing online communications in learning environments. Levin, Kim, and Riel (1990) suggest that the best way to look at computer conferencing is to first do a participant structure analysis which gives descriptive details of the network that help in more advanced methods of analyzing messages. These more advanced techniques include the intermessage reference analysis (looks at message threads), a message act analysis, which identifies the function to be accomplished by each message and a message flow analysis.

One approach to analyzing collaboration in a computer-supported collaborative learning environment has been suggested by Henri (1991). Henri's method of content analysis, dealt with the "product" of learning and focused on the dialog and interaction that occur in an asynchronous learning network. This model fits well into the collaborative learning model and consisted of five dimensions: Participative, Social, Interactive, Cognitive, and Metacognitive. The participative dimension focuses on patterns of usage. Henri believes that quantitative data can be a useful component of her content analysis model when combined with the other dimensions. When looking at the participative dimension quantitatively one must consider "...data covering the totality of the messages issued but all participants, and data concerning the participation of the learners and educators in the learning activity." (p.124). The data collected in this dimension may tell us about the group learning process by looking at the number of interactions between students. The social dimension refers to all statements that do not refer to the formal content of subject matter. Henri refers to both implicit and explicit interactions in the interactive dimension. Implicit interactions are those messages that refer to more than one idea and do not refer to the connection between ideas. Explicit interactions reference one or more ideas and are connected one or more specific messages. Henri suggests that the interactive, the cognitive, and the metacognitive dimensions can all be measured using her content analysis approach. Henri's methodology for content analysis has been utilized in several studies that analyze online discourse (Barret & Lally, 1999; McDonald & Gibson, 1998; Oliver, Omari, & Herrington, 1998).

Lee, Liang, and Chan (1995) developed a model of analysis that looks at particular styles of interactions based on a socio-activity learning model. In this model cognitive development is dependent on the social interactions that occur in the learning environment, be it face-to-face or on-

Table 2

Interaction Analysis Model — Adapted from Lee, Liange, and Chan (1999)

Type	Usage	Categories		
		Domain-Specific	General	Emotional
Suggestions		X	X	X
	Give Suggestions			
	Accept Suggestions	X	X	X
Questions	As Question	X	X	X
	Answer question	X	X	X
Instructions		X	X	
	Request Instruction			
	Give Instruction	X	X	
	Demonstrate	X		
	Follow Instruction	X	X	
Strategies		X	X	
	Identify Problem			
	Check Other's Understanding	X		
	Elicit Inquiry	X	X	
	Admit Failure	X	X	
	Self-correction	X		
Comments	Comment	X	X	X
	Respond to Comment	X	X	X
Others				X
	Show Gratitude			
	Show Support			X

line. They have developed an interaction analysis table that classifies interactions into three dimensions: category by type by usage. (See Table 2). The types of interactions and the usage of each include suggestions (give/accept), questions (ask/answer), instructions (request/give/demonstrate/follow), strategies (identify problem/check other's knowledge/elicit inquiry/admit failure/self-correction), comments(comment/respond), and others(show gratitude/show support). These types and usage classifications can then be grouped under the categories of information: domain-specific , general, and emotional. Domain specific knowledge refers to information that is needed to complete a task and one or more of the learners may not possess this knowledge. The general category refers to a learner seeking guidance to overcome an impasse. The emotional category refers to the affective support that one might offer or seek when interacting in a collaborative activity.

Other methods of analysis such as a case study approach (Waggoner, 1991), have been also been suggested and utilized to investigate interaction patterns in CMC. He suggests that both qualitative and quantitative data can be collected to analyze the integration of technical and teaching social subsystems, member participation, outcome measures (knowledge attainment), and leadership activity. To gain a thorough understanding of the complexity of computer conferencing one must look at many interacting variables

In response to these early attempts at measuring CMC in a learning environment. Gunawardena, Anderson, and Lowe (1996) "...searched for a constructivist content-analysis model to apply to conference transcripts. In particular the authors hoped to find a rationale for determining, by analysis of the transcripts, that the co-creation of knowledge had occurred through the pooling of individuals' knowledge or that the negotiation of meaning had occurred (p.9)." They discovered that there was no model to accomplish this and developed a model of content analysis

that looked at phases of the learning process. These phases included sharing/comparing, dissonance, negotiation, testing tentative constructions, and statement/application of newly-constructed knowledge. The transcripts were coded using these conventions and a qualitative analysis was performed. They suggested that previous methods of content analysis were too complex and that a simpler model would be more practical in evaluating online learning in CMC systems.

The physical process by which analysis is performed according to this model is simpler than the analytical processes developed by either Henri or Levin, et al. One begins by simply rereading the transcript with a mental ear cocked to detect the shifts in tone which may mark a transition from one phase to another. The question which should be held in mind at this stage is "did anything happen here?" That is, can one see evidence that the discussion proceeded through at least the first three stages? The answer to these questions may provide a preliminary judgment of the quality of the conference. Roughly speaking, the more phases the conference illustrates, the more participants who are active at each phase, and the greater the variety of resources the participants call upon in the process of negotiation of meaning or construction of knowledge, the higher the quality of the conference. A preliminary division into phases is marked during this initial rereading. (Gunawardena, Anderson, & Lowe, 1996, p.12).

The conference that the Gunawardena, Anderson, and Lowe model was constructed for consisted of an international group of experts. However, the authors feel that it is easily adaptable to situations like a typical classroom situation provided that "the moderator in such a case is open to conceptualizing the learning process as a joint construction of knowledge or negotiation of meaning. (P.17)".

Conclusion

The preceding review of the literature has provided an overview of relevant theoretical constructs and research that form the framework for this study. Students' collaboration can be an effective way of reforming instructional practices in today's college classroom. Even in distance learning environments a need exists to encourage the collaborative process. The barriers that may

exist in learning at a distance can be overcome and computer-mediated communications is a promising mode of interaction for supporting collaborative projects in college classrooms. There appears to be evidence that CMC when used in conjunction with traditional pedagogies, may very well enhance student learning outcomes and help enhance overall satisfaction with the process. Considering theoretical models of communications, in general, and applying them to online discourse in ways that are appropriate, implications to instructional strategies become apparent.

CHAPTER 3 METHODOLOGY

This chapter will provide details of the methodologies that were utilized in this study. A description of the participants in this study and the techniques that were utilized to select them will be given. The setting and characteristics of the class that was selected will be provided. Next the data sources and a detailed, step-by-step description of the procedures will be described.

Design and Sampling

In this study, descriptive statistics of usage data and a manifest content analysis of transcripts from discussion groups, chat sessions, student questionnaires, student reflective journals, and group project products were conducted. A multi-case study of six collaborative groups was conducted. Qualitative research methodologies were utilized to gain a rich understanding of the processes that occur in an online learning environment in which small group projects were conducted. A concurrent analysis of these different data sources, also known as triangulation of data sources (Patton, 1990) was conducted.

The sampling for this study utilized purposive strategies (Patton, 1990) in particular, criterion and convenience sampling. The predetermined criterion of importance was an undergraduate course that required a collaborative group project in which online communication component was used to facilitate group dialog. Two courses offered during the Fall semester of 2000 were found that met these criteria were easily accessible, and that were taught by an instructor willing to participate. The one that best met the purposes of this research was an undergraduate course in educational technology in which the professor required students to undertake an extended collaborative project.

The students in this course consisted of 21 undergraduate students whose primary discipline area was in business. There were also several education majors, a liberal arts major, and a student from the School of Design. Most of the students were well into their degree program and were taking this course as an elective for completion of their degree programs.

Role and Perspectives of the Researcher

For the entirety of this research project the principle researcher in this study was a participant observer (Patton, 1990). It was agreed that the primary instructor and researcher would co-teach the course and would be actively involved in both instruction and in assisting in course assignments. The instructor and the researcher worked closely together in creating the materials and implementing the collaborative group projects.

The researcher, previous to this study, had participated in a pilot program in implementing Blackboard into several distance education courses at the university in which this study took place. He worked closely with several instructors in developing online environments that supported courses delivered via compressed video at both the undergraduate and graduate levels. Through this experience his interests focused on the utilization of online communications to support both distant and traditional course offerings at the university level. The researcher believes that CMC has a place in both settings and if implemented effectively can enhance student learning through increased participation, greater interactions between students, and providing a more student-centered learning environment.

Context

The course selected for this study was composed of upper level undergraduate students at a major state university. The main objective of the course was to teach students basic instructional

design principles and to introduce them to the use of technology in learning environments. The course goals were as follows:

- Students will gain an understanding of the application of educational technologies for teaching and learning.
- Students will understand the fundamental concepts of designing learning tools, visual design, visual literacy, and instructional computing.
- Students will experience hands on tasks in which they will design and implement instructional media that facilitates learning to achieve curriculum goals and instructional objectives.

Evaluation of student performance was based on four components: two exams, a multimedia project, a presentation project, and a web design project. This study focuses on the web design project that occurred over the last half of the course. For a detailed description of the web design project and the modules that made up the project see Appendix A.

The class was scheduled to meet weekly for one and a half hour sessions. For the web site project instructional meetings were held on Tuesday and an open lab was offered on Thursdays. All students were required to use the online communications components available on the Blackboard site. The classroom was in a PC networked Windows based computer lab that contained 21 desktop computers that contained basic software to create web pages. Scanners, a digital camera and a digital video camera were available in the lab. The students were provided with Microsoft FrontPage Express in the lab and one computer was equipped with FrontPage 2000 to streamline compilation and publishing of each final Web site project. Students also had access to FrontPage 2000 in computer labs across the campus. A compression utility software package was provided to aid students in the transfer of large files. They also had access to animation software,

sound and video editors, photo enhancement and scanning software, and to word processing software.

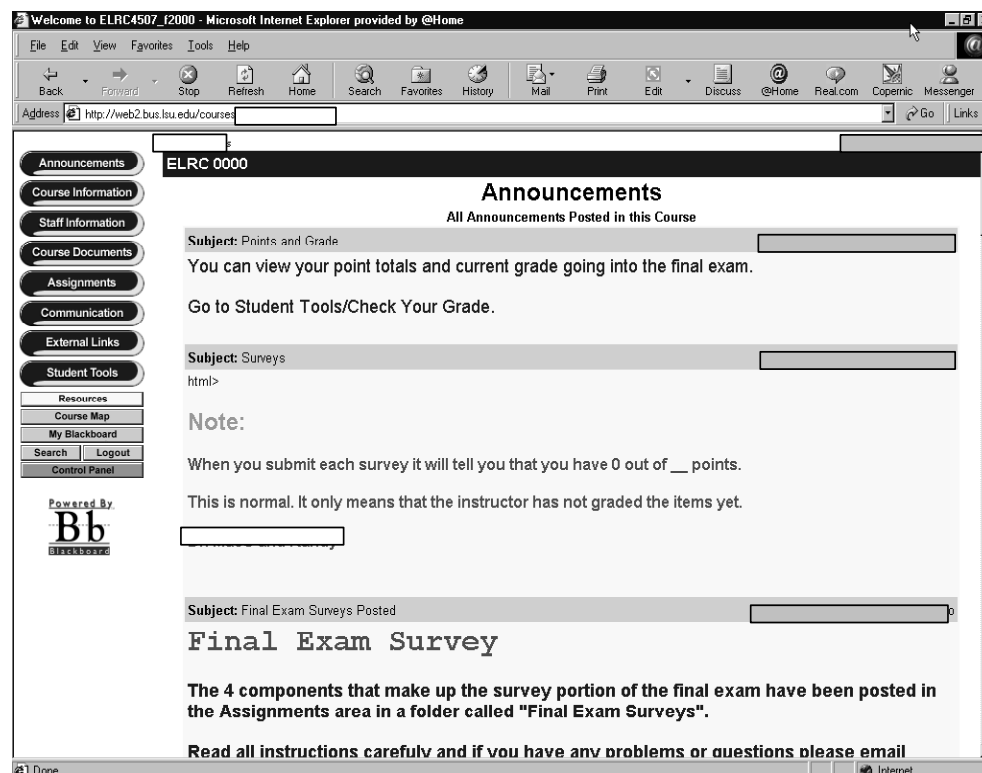


Figure 1. Blackboard opening screen.

In addition to the lab environment the instructor provided Blackboard (2001) a courseware management system for all students to use. Blackboard is an integrated web environment that allows instructors to easily create and maintain a web presence for their courses. The system consists of areas that can be accessed by students from any place at any time via an Internet connection (See Figure 1 for a snapshot of the initial page). Other major components of the system are areas to post announcements, course information, course documents, assignments, a communication area, and an area that provides access to collaborative tools for each project group. Instructors can easily post daily and weekly announcements, course documents (syllabus, schedules, etc.), staff information, course materials (handouts, lecture notes, PowerPoint

presentations, etc.), assignments, online quizzes and surveys, and external web links to sites of interest to the class. Students have access to the above components and can view, download, or print out any of this information. There are also student tools that allow students to create a basic website containing information about themselves and a picture, to check their grades if the instructor is using the online grade book provided within the system, and to send digital files to the instructor. There are three primary communications components integrated into the program. Students and instructors have access to all of these areas (See Figure 2). There is a basic e-mail

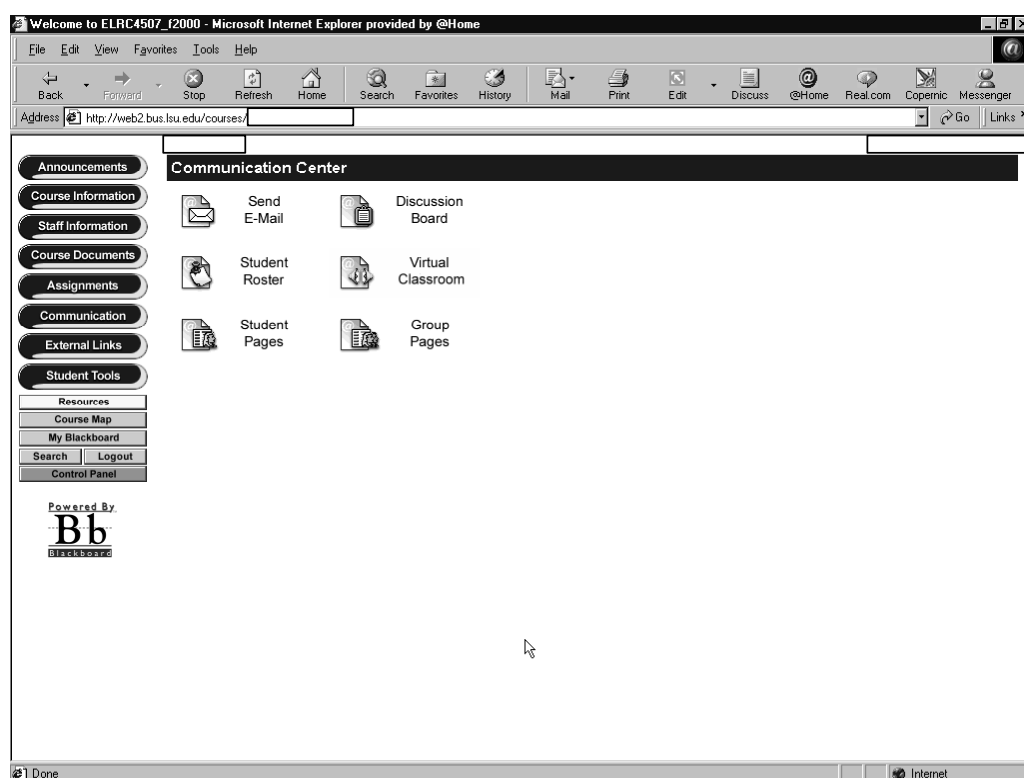


Figure 2. Blackboard communications area.

tool built into the Blackboard site that allows one to e-mail an individual, groups of individuals, the instructor(s), or the entire class. Another feature is an synchronous virtual classroom (or chat room) where students can join others within the class for live, real time interactive discussions.

This area has a white board for use by discussants. The instructor has the ability to control these discussions by controlling who has the floor or who is allowed access to a chat session. The final area of communications is an asynchronous discussion area where students and instructors can post messages and respond to others postings. Instructors create forums or topics for discussion and students then are given the opportunity to respond in a manner that is not time and place dependent, as long as they have access to a computer connected to the Internet. Students can create new threads to the discussion topics or can respond to the comments of others in the forum. Another feature that was important for this course was the instructor's ability to create group areas (see Figure 3). These areas are set up for specific students and provide private discussion groups, chat areas, file transfer areas, and e-mail facilities that each group can use to their own devices.

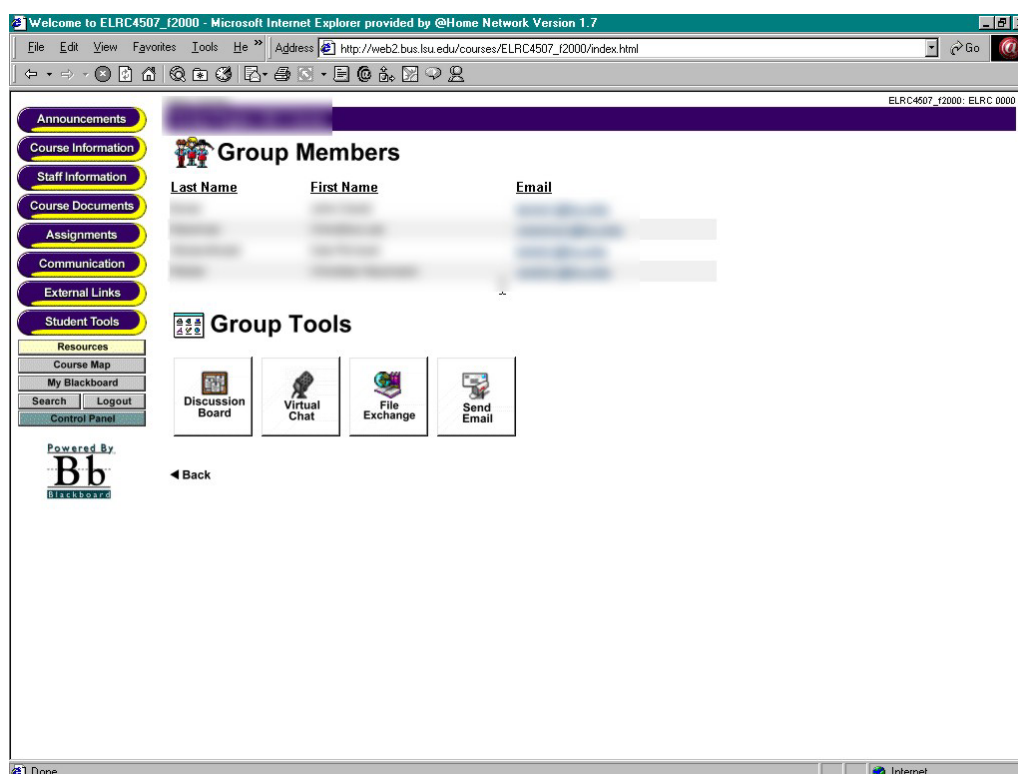


Figure 3 Blackboard group pages.

Procedures

Preliminary Tasks

Before the semester the instructor of record and the researcher met to establish the specifications for the collaborative project. Goals and objectives were established, the required components of the project were defined, instructional strategies were determined, and evaluation standards were discussed. The start and completion dates were then determined.

Group Formation

The cases chosen for this study consisted of the groups that were formed. There were 21 students enrolled in the course which allowed for three groups of three and three groups of four. Students were administered the online version of the Keirsey Temperament Sorter (Keirsey, 2000) and the results were used in the formation of the collaborative groups. The instrument determines the personality style of individuals and was used as a guide in making sure that each team was composed of a diverse mix of personality types. This was done so that groups were not dominated by one specific type, such as those that were inclined to be leaders, followers, etc. Some adjustments were necessary to insure that each group was balanced for gender. Once groups were formed they were given an opportunity to get to know each other in class on the day the project was introduced and explained. Table 3 shows the groups that were formed with gender type, personality type and their major discipline of study. The names shown are fictitious to protect the identities of the subjects.

The Collaborative Project Assignment

The purpose of the project was for students to demonstrate and apply the concepts of instructional design and production processes in preparing an informational web site. There were no specific guidelines given as to the subject and content of the site except that it had to convey information to a targeted audience. Each group was allowed to pick a topic for their web site and

Table 3

Group Assignment

Group -Name	Gender	Personality Type	Major
The Sports Fanatics			
-James	Male	Guardian Supervisor	A&S/GS
-Carol	Female	Idealist Teacher	EDUC/SECED
-Kevin	Male	Guardian Supervisor	BADM/ACCT
-Charles	Male	Artisan Promoter	BADM/ACCT
The Food Lovers			
-Anna	Female	Guardian Protector	DESN/ID
-Simon	Male	Guardian Supervisor	BADM/MGT
-Mary	Female	Guardian Provider	BADM/ACCT
The City Dwellers			
-Lori	Female	Guardian Protector	BADM/ITF
-George	Male	Guardian Supervisor	BADM/GBUS
-Terry	Female	Guardian Provider	BADM/ACCT
The Gymnomaniaacs			
-Melvin	Female	Guardian Supervisor	BADM/MKT
-Simon	Male	Guardian Supervisor	JD/SECED
-Peter	Female	Idealist Champion	A&S/MATH
-Elizabeth			
The Head Chefs			
-Bill	Male	Guardian Supervisor	BADM/MGT
-Jeff	Male	Idealist Champion	A&S/GS
-Simonn	Male	Guardian Provider	BADM/MGT
-Melanie	Female	Guardian Provider	BADM/MGT
The Generals			
-Cindy	Female	Guardian Protector	DESN/ID
-Richard	Male	Guardian Provider	BADM/MGT
-Jenny	Female	Guardian Supervisor	BADM/ACCT

the specific content that they would be included in the site. They were required to submit a proposal describing the focus and audience for whom the web site was intended.

The assignment was structured and consisted of three modules which led to the completion of the website. Each module was to be completed at specific times during the six weeks of the project cycle. The website design was to follow established guidelines for designing Web sites

(Davis & Merritt, 1998). The first module was the “Planning the Website” phase of the project. Specific requirements for this module can be found in Appendix B. The second module was titled “Designing and Developing the Website”. Once students completed the planning phase of the project they were then to design and develop the site. Each site was to contain twelve web pages and had to meet specific guidelines (See Appendix B). Finally, the “Implementing the Website” module required students to test their website, post the site to a Web server, and to test the site. Throughout the project each group was required to discuss and plan their project using the online discussion board or virtual chat facility in the Blackboard environment. They were not discouraged from meeting face-to-face outside of class. They were each to submit a weekly reflective journal describing their experiences in the collaborative process.

Students were presented with the project guidelines in class around midterm and were instructed that they would be required to attend class on Tuesdays and that they would have Thursdays to working in their groups. Tuesdays were instructional in nature and students were instructed in website design issues, using FrontPage Express, working with website files and the file system of a website, and how to import and export website files to the web server. Thursdays were open lab days for individual and group collaboration and the instructor and research were available to aid and help students with the assignment.

In Module 1 (weeks 1 and 2) students were required to look for three websites that exemplified the guidelines put forth by Davis and Merritt (1998). They were also asked to determine the goals and objectives of the website that their group would create. Finally, they were to determine a name for their group. Module 2a was due during the third week of the project and required students to discuss online a set of design issues (Davis and Merritt, 1998) that were pertinent to the design of their web sites. They were also instructed to begin collecting the

components (text, graphics, photos, video/audio, etc.) that they would need to include. On Tuesday of the third week of the project they were allowed time in class to work on a storyboard (a sketch of their web site). One week later (the fourth week) they were required to submit a shell of their web site (a very sketchy draft of the actual site) using FrontPage Express this being Module 2b. Module 2c was the completion of a prototype (a working untested version) of the web site and was due during the seventh week of the project. The final version of the project, that is the prototype tested and reviewed by outside sources, was due on the last day of the eighth week of the project and was to be posted to the designated web server. Throughout these Modules the students were required to use the online communications systems to work on their projects, especially when instructed to do so.

A strong effort was made to minimize the involvement of the instructors in actual group processes. Groups were encouraged to work independently of each other. They were advised to use problem solving strategies relying on each other to work toward task completion and were informed that instructors would be available to help solve technical problems and to provide instructional design advice. Instructor participation in group online discourse (discussion forums and chat sessions) was kept to a minimum. Instructor dialog in discussion forums were limited to questions posted that were of a technical nature or when messages were posted that were directed to the instructors.

Data Collection

Data were collected from several sources. The first was the course statistics that are compiled by the Blackboard software and includes data of student participation in the Blackboard environment. The second source of data was from transcripts of online communications that are archived by Blackboard. A third source of data was from weekly reflective journals submitted individually by each student. At the end of the semester the Student Perception and Attitude

Questionnaire was administered to each student. Finally the final project created by each group was collected for analysis using the Quality of Website Rubric designed for the evaluation of each project.

Data available for determining usage were retrieved from the Blackboard courseware design system. This software tracks student usage by counting the number of hits (a hit being every time one accesses a page of the web site) for each component of the Blackboard site (i.e. Course Documents, Assignments, Communications, etc.) for each member of the class. Blackboard statistics can be collected at the anytime, as long as the course site is still active. Reports can be generated for individual students from the Communications Area and for the Group Pages for each day of the project period. To create a report one selects the area of Blackboard (i.e. the Communications Area, the Group Pages, etc.) and the student, the group of students, or the entire class that one wishes the Blackboard statistics component to compile. A date or range of dates may also be specified. This data is compiled in a database within the Blackboard system once a course website is created and remains available until either it is the course is deleted or is recycled for use during another semester. The instructor may also request that the course be archived, maintaining all data collected over the course of the semester.

All data for the qualitative analysis of the interactions that occurred in the online dialog throughout the project activity was collected from the electronic discourse stored in the archives that are created by the Blackboard software for the discussion forums and the chat sessions. The Blackboard communications system notes the respondent's name, the time that a response was entered, and the date of entry.

Discussion Forums were created for each module of the project (See Figure 4 for a sample opening screen the Blackboard Discussion Board). A forum is a main topic created by the

instructor where students may post messages to each other. Discussion dialogs are composed of threads and responses to those threads. A thread is an initial response to a forum topic. Discussion participants may create new threads or respond to threads that have already been posted. The initial view of a forum displays the subject heading for all postings. These responses fall under each thread and are indented to the right and are preceded by RE:. The depth of the responses to a thread can be determined by the number of RE:'s before a topic. Discussants may also respond to these responses. These responses are indented further to the right. One has the option of either viewing just the threads of a discussion forum or can expand the thread list to reveal all threads and the replies to these threads. The heading, the author, and the date a thread or response was posted are provided in this view (See Figure 5).

Individual messages can be read by clicking on the subject heading (See figure 6). One can then proceed through the thread and read each response. An alternative to reading each message in isolation is to collect all messages for viewing on one screen (See Figure 7). Check boxes appear to the left of each heading. To collect messages for viewing one need only check the messages that they want to read. There is an option to select all messages for collection, to unselect all messages, and to invert the boxes checked. The communications software for the discussion area allows one to sort responses by thread (default), date, author, and subject.

All synchronous dialog that transpired in the Virtual Chat room was automatically archived by date. These chat sessions were downloaded in text format and copied and pasted into a Word document. The text were cleaned and formatted for compatibility with the data analysis software and each session will be saved in a separate digital file coded by group number, module, and date. Only those sessions in which substantial interaction occurs will be gathered for analysis. The

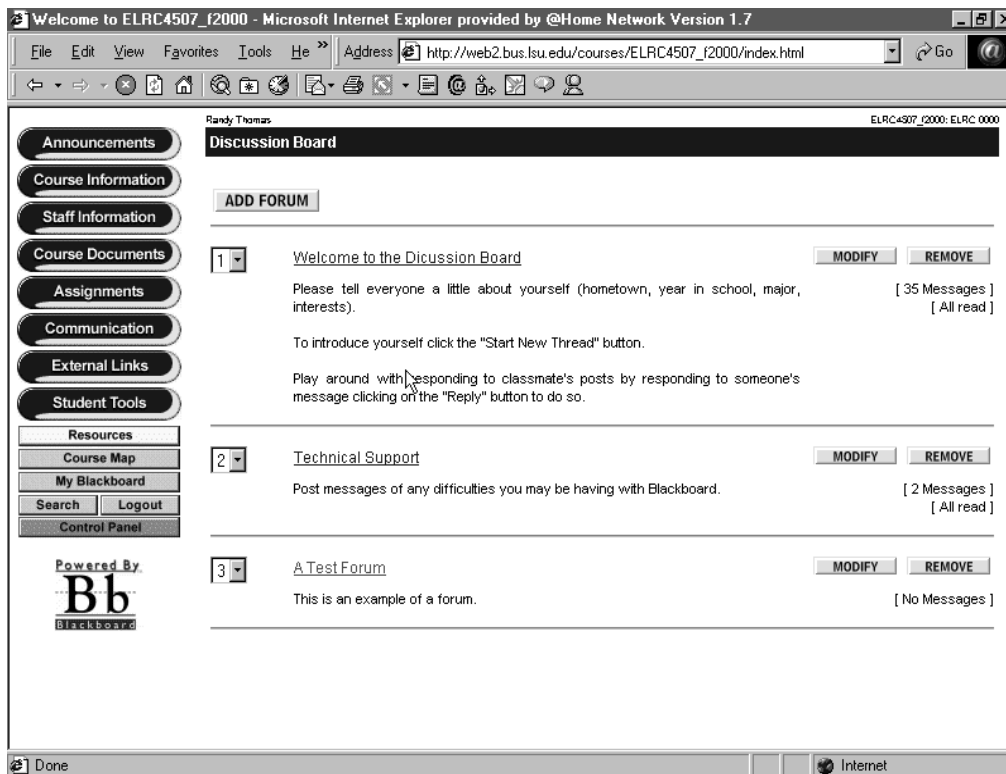


Figure 4. Opening discussion screen.

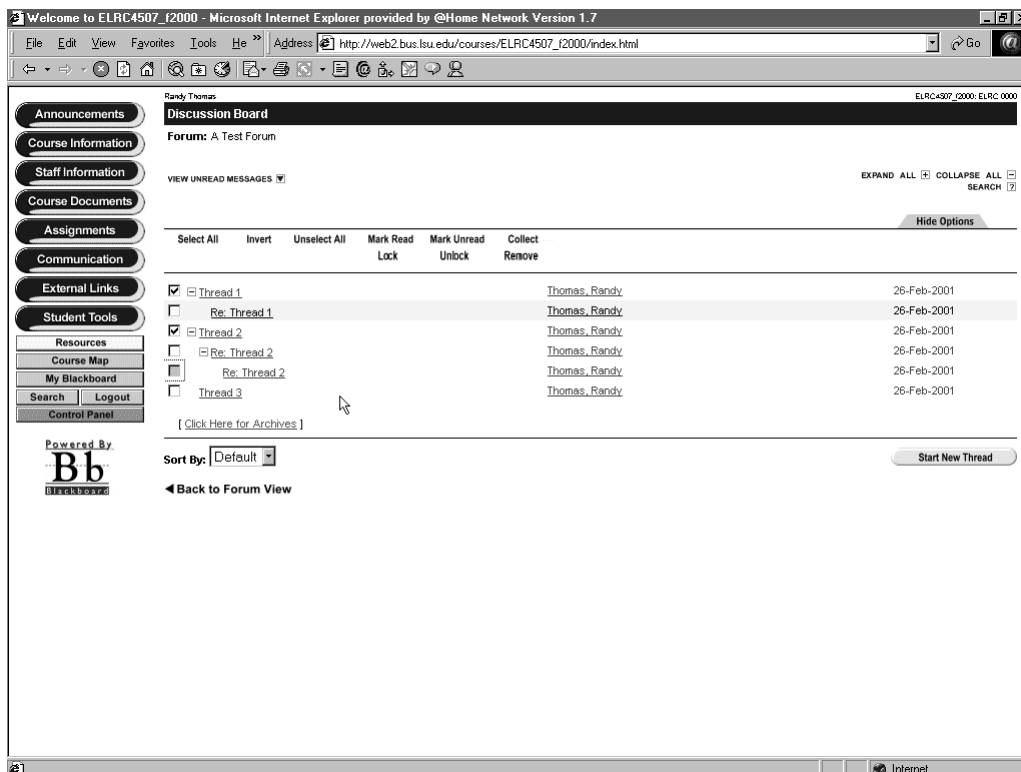


Figure 5. Threaded discussion topics.

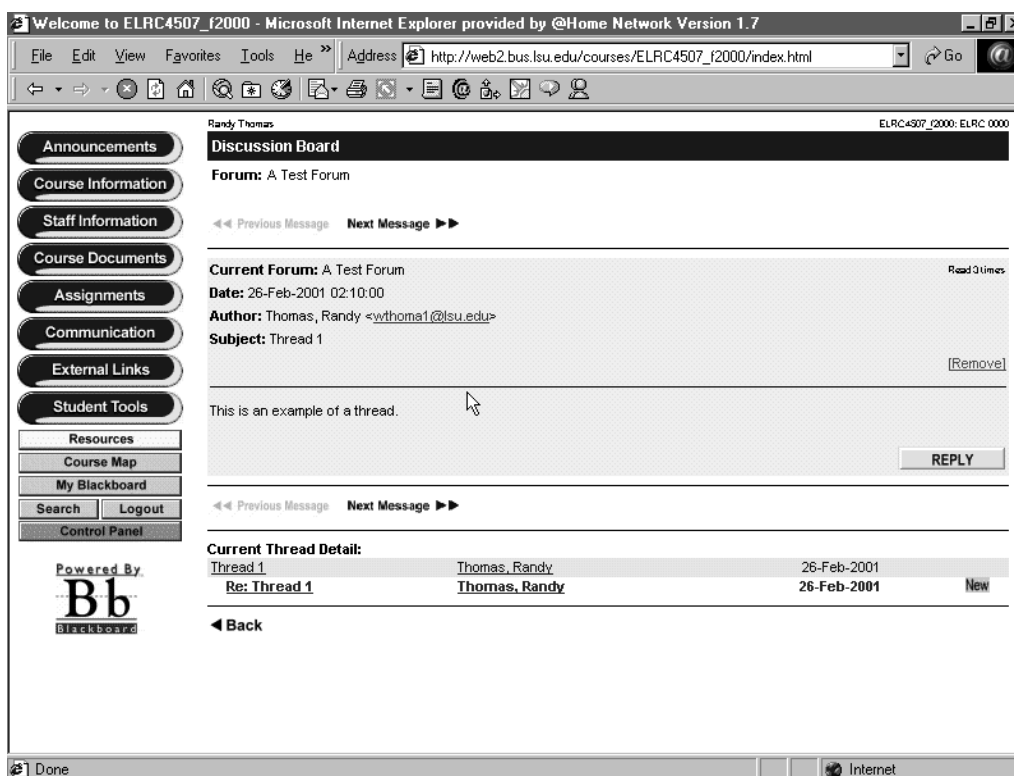


Figure 6. Discussion message.

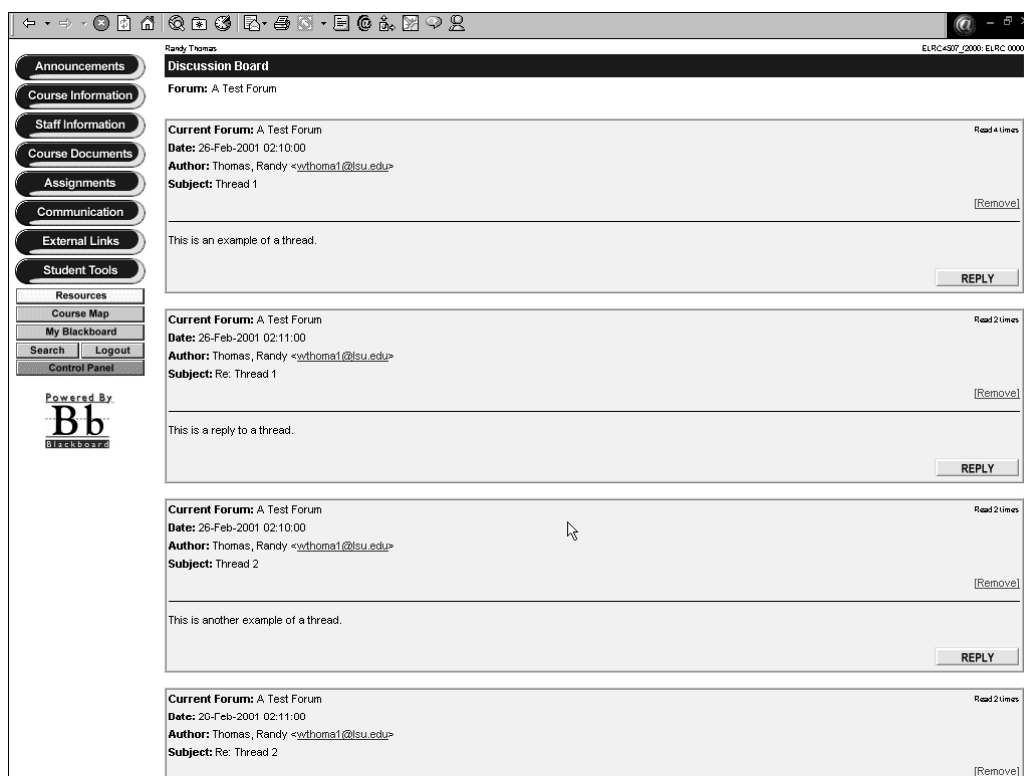


Figure 7. Select collected messages.

minimum requirement will be for two or more persons to log on to the chat session at some time and for discourse relevant to the project to be present.

Students were required as part of their final exam to answer several open-ended questions that gathered information that reflected the student perception of the collaborative process. They were given one week to complete this questionnaire and all students complied. The online questionnaire was created using the evaluation tools provided by the Blackboard software. Once the questionnaire was created it was posted to the website and students were instructed to take it at their own leisure. The questionnaire was made available one week before the scheduled final exam. The data was collected and saved digitally as in the previous two sections.

Students were required to submit one reflective journal every week over the extent of the project that expressed their thoughts and feelings concerning their experiences with their group, any problems they might be having with other group members, their thoughts on the collaborative process, and any positive experiences they might have had. The journal entries were approximately 10% of the project grade and were graded individually, rather than collectively for each group. They were scored partially for completion and submission and partly for the quality of their reflections. These journal entries were submitted to the instructor's e-mail address and were due on Tuesday of each week. Students were informed that no one but the instructor would see these reflections and were encouraged to be candid and truthful. They would not be penalized for what they said in the journal.

Students were given free reign during the first weeks of the project. For the last three entries they were asked to respond to a question posed by the instructor concerning the collaborative process. These questions were focused on the collaborative skills and on student attitudes concerning instructional design issues of the project.

Instrumentation

Keirsey Temperament Sorter

The Keirsey Temperament Sorter II (KTS II) was selected to determine each student's personality characteristics (Keirsey, 1998). The KTS II is a 70 item survey asking subjects to choose between two responses to a statement that reflects some aspect of character. The purpose of the instrument is to determine, through self evaluation, what character traits the person exhibits. David Keirsey developed the instrument to determine personality types based on the earlier works of Carl Jung, Isabel Myers, and Kathryn Briggs on personality types. In particular he expanded the work of Myers and Briggs and their development of "The Myers-Briggs Type Indicator" (MBTI) a tool for the identity of kinds of personality inherent in individuals (Myers, 1987; Myers & McCaulley, 1985; Myers & Myers, 1980).

Table 4

Comparison of the MBTI and the KTS II (Keisery, 1998)

Myers-Briggs Types		
E = Extraverted	or	I = Introverted
S = Sensory	or	N = Intuitive
T = Thinking	or	F = Feeling
J = Judging	or	P = Perceiving
Keirsey Reinterpretation		
E= Expressive	or	I = Reserved
S = Observant	or	N = Introspective
T = Tough-minded	or	F = Friendly
J = Scheduling	or	P = Probing

Table 5

Description of Temperament Types (Keirsey, 1998)

Gaurdians (SJs)	Artisans (SPs)
Provider (eSfJ) Protector (iSfJ) Supervisors (eStJ) Inspector (iStJ)	Composers (iSfP) Performer (eSfP) Promoter (eStP) Crafter (iStP)
<p>“...all Guardians seem to have a great capacity for logistical reliability, but some (the tough-minded SJs) are drawn to the directive role of Administrator of policies and procedures, while others (the friendly SJs) prefer the informative role of Conservator of people and property. These two divisions can be further broken down to reflect an expressive or a reserved social attitude, with the Administrators tending to play the role variants of Supervisor or Inspector, and the conservators playing Provider or Protector (Keirsey, 1998, p. 104).”</p>	<p>“...all Artisans seem to have a gift for tactical artistry, but some (the tough-minded SPs) are drawn to the directive role of Operator, while others (the friendly SPs) take up the informative or reporting role of Entertainer. These two divisions can be further broken down to reflect an expressive or a reserved social attitude, with the Operators tending to play the role variants of Promoter or Crafter, and the Entertainers playing Performer or Composer. (Keirsey, 1998, p. 63)”</p>
Idealists (NFs)	Rationals (NTs)
Champion (eNFp) Healer (iNFp) Teacher (eNFj) Counselor (iNFj)	Inventor (eNTp) Architect (iNTp) Field-marshal (eNTj) Mastermind (iNTj)
<p>“...all the Idealists seem to have a great capacity for diplomatic empathy, but some (the scheduling NFs) are drawn to the directive role of Mentor of human development, while others (the probing NFs) prefer the informative role of Advocate of harmonious interaction. These two divisions can be further broken down to reflect an expressive or a reserved social attitude, with the Mentors tending to play the role variants of Teacher or counselor, and the Advocates playing Champion or Healer (Keirsey, 1998, p. 149).”</p>	<p>“...all the Rationals seem to have a natural gift for strategic ingenuity, but some (the scheduling NTs) are drawn to the directive role of Coordinator of efficient campaigns and contingency plans, while others (the probing NTs) prefer the informative role of Engineer of efficient prototypes and models. These two divisions can be further broken down to reflect an expressive or a reserved social attitude, with the Coordinators tending to play the role variants of field marshal or Mastermind, and the Engineers playing Inventors or Architects (Keirsey, 1998, p. 196).”</p>

The MBTI produces a four-letter indicator that determines what personality type most likely represents an individual. These types are based on four pairs of alternatives: 1) extroversion/introversion; 2) sensory/intuitive; 3) thinking/feeling; 4) judging/ perceiving. Keirsey (1998) reinterpreted these pairs as follows: 1) expressive/reserved; 2) observant/introspective; 3) tough-minded/friendly; and 4) scheduling/probing (See Table 4).

Keirsey went on to look at the historical development of personality theories and found there are common threads in most. He synthesized the numerous constructs concerning personality and came up with four major types: guardians (SJs), artisans (SPs), idealists (NFs), and rationals (NTs). Under each type there are four possible character types, again allowing for 16 possible personalities and character types. See Table 5 for a list of these 16 types and an overview the major categories.

Student Perception and Attitude Questionnaire

An online fifteen item questionnaire with open-ended items was developed to gather data from students to provide information about student attitudes and perceptions (See Appendix C for these questions). Questions were asked that referred to the leadership roles that members took, individual responsibilities towards completion of project tasks, the distribution of project tasks, and the resolution of conflicts and coming to a consensus. Another set of questions focused on what

CMC systems each group utilized and why they found each useful and also were asked what their personal preferences were and why. They were also asked to evaluate the Blackboard system. The third set of questions asked students about their satisfaction and/or dissatisfaction of the project-based learning activity. The final set of questions asked students if they had any previous courses that utilized collaborative learning, CMC, and CSCL.

Evaluation of Final Student Projects

A scoring rubric was created by the instructor and researcher to evaluate each group project based on a set of criteria that measured the overall quality of each web site (see Table 6). There were three major components that were identified as being important in an effective web site: content, design, and creativity. Content consisted of elements that pertained to complexity, depth, relevance, and writing style. The websites were then evaluated as to important design elements such as balance, unity, consistency, and contrast. Creativity was judged according its personality, the use of metaphors, whether it contained unusual perspectives, and the interactive components included in the web site. For a detailed description of each of these scoring criteria refer to Appendix D.

Table 6: Rubric for Scoring Website Quality

		Rating			Score
Content	Complexity	1	2	3	
	Depth	1	2	3	
	Relevance	1	2	3	
	Accuracy	1	2	3	
Design	Balance	1	2	3	
	Unity	1	2	3	
	Consistency	1	2	3	
	Contrast	1	2	3	
Creativity	Personality	1	2	3	
	Use of Metaphor	1	2	3	
	Unusual Perspectives	1	2	3	
	Interactivity	1	2	3	

Participant Confidentiality

Students were informed on the last day of class that certain data from this class might be used to help us better understand the collaborative process in an online learning environment. They were not told of the data collection to prevent possible influences on their performance if they

knew they were being observed for this purpose. A consent form stating that we were interested in documenting each student's experiences in order that we might gather valuable information concerning the process was distributed to each student. Guarantees of confidentiality were also included on the consent form. They were asked to read the form and to sign and date it. All students complied with this request. All individual and group names have been changed to protect the privacy and confidentiality of each participant in this study. An application for exception was submitted and accepted by the IRB before the study was conducted (see Appendix F).

CHAPTER 4

RESULTS

This chapter will give a detailed explanation of the development, implementation, and results of the analytical framework for this study. The study was designed as a multiple case study and several techniques were used to analyze the various data sources that were gathered. Content analysis of online transcripts of dialog that occurred during CMC interactions was conducted and a constant-comparative analysis of the open-ended survey that all participants provided at the end of the study was conducted using Atlas-ti, a qualitative analysis software package. The CMC data were analyzed using the techniques of a manifest content analysis (Berelson, 1952) based on a model developed by the researcher. An overview of the development of this model will be provided. The data were coded, organized, and quantified using the software mentioned above to develop descriptive statistics to answer the research questions concerning the interactions that occurred in the online dialog. Responses to the open-ended survey were analyzed using the constant-comparative method (Glaser & Strauss, 1967) of analysis to determine the perceptions and attitudes of the participants. Student characteristics were compiled from the KTS-II. Finally, student experience levels in using CMC and their exposure to collaborative learning activities in prior classes was determined from questions posed in the open-ended survey. Descriptions of the processes that occurred during the analysis phase of this study follows providing an in depth accounting of the analysis methodologies used in this study.

The first question guiding this research was what kind of interactions occur between group members in the process of completing a project-based learning task in a computer-mediated

learning environment? The underlying questions, some of which were established prior to conducting the research and some which emerged were:

- How did the online interactions within groups evolve over the phases of planning, design, and development of their projects?
- How did the online interactions differ across the asynchronous and synchronous systems?
- How were the interactions different between high performing and low performing groups?
- In what ways did individuals of varying temperament types differ in the dialogic contributions they made towards task completion?

Results from the analysis of the open-ended survey questions will be discussed in narrative form. This will include the interpretation of the participant responses and how they answered the research questions related to student perceptions and attitudes. The primary guiding this phase of the research was, What are student perceptions and attitudes towards participation in the completion of a project in a learning environment that utilizes CMC systems as a tool for collaboration? The specific questions formulated to explore this were:

- What preferences did the groups have for the different types of CMC systems?
- What differences existed in the perception of students about leadership and task distribution between high and low performing groups?
- What were the perceptions and attitudes of students concerning the collaborative project what suggestions did they offer to improve the experience?

Development of the Model for the Analysis of CMC Dialog

Several models were considered to guide the analysis of interactions that occurred in the context of the CMC systems that study participants utilized to complete their project tasks. The first proposed coding scheme as suggested by Gunawardena, Anderson, and Lowe (1996) for online discussions was the initial consideration for guiding the research for this study, and although interesting, did not fit well with the context of this study. Their categories of interaction did not

accommodate the data collected in this study. In the discussion of their model, Gunawardena, Anderson, and Lowe (1996) mention Henri's interaction analysis model for asynchronous discussions (Henri, 1991). This model was investigated and looked promising, particularly given that the model has been used in numerous studies that look at interaction patterns in online collaboration. A decision was reached to do a preliminary analysis of a sample of the data collected for this study using the Henri. After some preliminary coding and analysis of the results it was determined that Henri's model, though often used by others, posed significant problems in interpreting the interactions that occur. Not wishing to totally abandon this model, an attempt was made to combine Henri's coding model with the suggestions given in Bosworth's (1994) taxonomy of skills necessary for effective learning in collaborative environments. The model and taxonomy paralleled each other on several aspects that had some relevance to some of the initial premises of this study. A model was developed that incorporated both Henri and Bosworth's suggestions and a sample of dialog was again coded and analyzed.

Still not fully satisfied with the results the researcher examined several studies that used all or some parts of Henri's model and began to note a common theme among these researchers. For the most part they concur with the researcher that the categories that Henri suggests are lacking in a strong set of operationally defined attributes that provide distinctive types of interactions that occur in online discussions. In particular, the dialog of interest for this study is that which is directed toward completing a project based learning activity. Henri's model primarily has been used for online discussions that are topic oriented. It was then decided to abandon this model and search for other models that investigated the online interactions in educational settings.

Lee, Liang, and Chan (1995) developed an interaction analysis table for a study of synchronous learning situations. This model was considered and again a sample of dialog was coded and analyzed. Although promising at first, as the analysis evolved weaknesses in the model

became apparent. First, the model was loosely based on some of Henri's suggestions which as mentioned above are not well suited for this study. Secondly, as the researcher got deeper into the coding, he realized that there were overlaps that posed serious problems in determining how certain passages should be coded. A comparison of the researcher's coding and another coder's interpretations yielded serious inconsistencies. It was again decided to search further for other possible frameworks to develop a coding scheme for this study.

After some consideration of the research literature on group processes and the interactions that occur within face-to-face groups, as well as that of problem based learning and the use of projects in learning, a model was developed by the researcher that provided a better fit with the purposes of this study. The IDEAL problem solving model (Bransford & Stein, 1993) was used to analyze the interactions that occurred towards the completion of tasks that were necessary to complete the project. Table 1 provides operational definitions of the codes that were utilized in the analysis of this data. It was also determined that some socio-emotional aspects that occur during the process of completing tasks in an online environment might be important in answering the research questions concerning task completion. Several theories of small group development and the social interactions occur within these groups were considered and it was determined that the model developed by Hare (1976, 1992) as described in Davies (1996) was best suited for answering the questions posed in this study. See Table 7 for the operational definitions of coding. Additionally, after some preliminary coding of the data three other attributes surfaced that were placed under a category called "Other", for lack of a better term to describe these instances.

Table 7

Interaction Analysis Model

Interactions	Types
Task Activity: Statements that refer to course content, project modules, or knowledge/information that is needed for tasks to be completed.	Identify Problem Students identify problems and opportunities in the context of the tasks that they might encounter in the project.
	Define Goals Students make decisions as to the goals needed for completion of project tasks.
	Explore Strategies Students determine the strategies that are needed to complete tasks for project completion.
	Act on Strategies Students perform the strategies that are necessary to complete the project task(s).
	Look Back Students reflect on completed tasks to determine if their goals are being met.
Socio-Emotional Statements that refer to task specific attributes that reflect personal feelings or affective support.	Show Solidarity Jokes, raises other's status, gives help or reward, shows sympathy/empathy, gives praise, shows appreciation, demonstrates commitment to the group.
	Show Antagonism Deflates other's status or defends/asserts self. Gives explanation of reasons a task is not completed on time. Apologizes for failure to complete task on time. Takes alternative action when another member is unable to complete tasks.
	Show Agreement Passive acceptance, understands, concurs, or, complies. Seeks approval. Seeks approval.
	Show Disagreement Passive rejection, formality, or withholds help.
Other Statements that refer to non-task specific attributes.	Off Task Socio-Emotional Statements that are socio-emotional and do not refer to task specific attributes.
	Organizational Statements that are related to facilitating online discussion or group tasks. May include references to fTf meetings.
	Technical Statements that refer to technical difficulties experienced or directly to issues that concern the system that the participant is using.

Samples of dialog were coded by two coders, the researcher and the primary instructor for the participating class and it was determined that the codes were distinct enough that inaccuracies in coding were likely to be minimal. When the two compared their coding it was determined that their interpretations were very similar and that for the purposes of this study, only one person (the researcher) would do the coding. After refining the coding procedures all synchronous and asynchronous transcripts of online discussion were coded using the qualitative software program, Atlas-ti. For an example of the coded data see Appendix E.

Data Analysis for Interaction Question

The process of gathering the data and importing it into Atlas-ti consisted of downloading the online discourse from the Blackboard course site and saving these transcripts into a file format that the program recognized. These “primary” documents were organized into primary document “families” first by the group from which the dialog originated and then according to the CMC system in which it occurred (asynchronous/synchronous). This was necessary in the management and retrieval of the tremendous number of documents that were imported into the analysis software (over 100 text files). This organization also was important in extracting quotes by group and by individuals in these groups and in determining frequencies of the various types of interactions that occurred for each group further down the line in the analysis process.

The responses of each participant in both the synchronous and asynchronous transcripts were coded first. This was accomplished using the autocoding features included in the qualitative software. This eliminated the necessity of reformatting and reediting the transcripts to facilitate the coding process. In addition to the autocoding feature the software allows one to select passages or “quotations” and then to “link” a code to that quotation through simple drag-and-drop features. These individual participant quotations served as the initial unit of analysis for coding. This was initially considered the most logical way to break down the dialog into manageable blocks for

coding, but as will be explained next this was really just the starting point for further consideration of what exactly comprised a unit to be coded.

Once each individual quotation was coded with the participants initials, an attempt was made to begin coding each subcategory for all major categories of the types of interactions that occurred during the course of completing tasks for the project. This almost immediately proved to be problematic. First there were 12 codes to consider and early in the coding process it was sometimes difficult to distinguish what code fit with a quotation. It was also difficult to determine where a quotation began and ended. After some thought it was decided that it might simplify matters to first select quotations that could be linked to the major categories of interaction (i.e. Task Activity, Socio-emotional, and Other). It also was at this point that the original determination that unit of analysis (individual quotes) might not be adequate. After careful consideration an uneasy choice was made to be somewhat flexible and not constrained by a set unit such as a paragraph or sentence. As the coding progressed it became apparent that this flexibility actually made coding easier and provided a more accurate interpretation of what was occurring. Fortunately, the Atlas-ti software allows one to be a bit more flexible because of its ability to have overlapping coding of quotations and still allows one to extract this information easily in an efficient way.

Once quotations were coded for all major categories these quotations were then coded with subcategory codes. Again the unit of analysis varied depending on the contents of a major category. For example a major category in the asynchronous system might consist of a quotation made up of several sentences. In this case each of these sentences might be linked to different subcategories. This was less problematic in synchronous systems, because in the interactions for each individual response tended to be only one sentence. Throughout the coding process code

families were created to help facilitate the coding process. This included code families for each group, as well as families for the major categories that included the subcategories. This helped simplify the coding of the major categories, the subcategories, and also provided a method to revisit quotations to determine whether or not they had been coded correctly. The coding of the transcripts was an evolving process that in the end produced what the research believes is an accurate portrayal of the types of interactions that occurred in the CMC systems

Coding was not limited to the twelve specific codes from the model. After all transcripts had been coded retrieval of specific quotations for each of these codes were facilitated through the use of the query tool provided in the program. To gather quotations for individuals for each interaction type this tool was used. First the documents that contained the quotations were queried. Next individual quotations that “enclosed” each interaction type quotation were retrieved. This can be thought of as interaction types being nested within the individual quotations. For example if one wanted to find participant quotations that contain “Identifying a Problem” they would run a query such as `**John ENCLOSSES I-Identify Problem`. This would retrieve all quotations that are linked to the code John and that contain the code I-Identify Problem. Once these quotation are retrieved one can then create a “super” code that is linked to these specific quotations. This provides one with a way of counting the incidences of John uttering a statement that refers to identifying a problem in his interactions with his group members. These frequencies can then be tallied using the program. This is the process that was used to retrieve these frequencies for each individual across the entire domain of the model.

Scoring Projects

Each group project was scored using a rubric designed specifically for this project (see Appendix D). The scoring scale was across three levels of High – 3, Adequate – 2, and Weak – 1.

Table 8

Scores for Project Evaluation Rubric

		Attribute													
Rater	Data	Accuracy	Balance	Complexity	Consistency	Contrast	Depth	Interactivity	Personality	Relevance	Unity	Unusual	Use of Metaphor	Grand Total	
1	The Food Lovers	3	3	3	2	3	2	3	3	3	2	3	3	33	
	The City Dwellers	2	2	2	2	2	1	1	2	2	1	1	1	19	
	The Gymnomaniacs	3	2	2	2	2	2	2	3	3	3	2	2	28	
	The Head Chefs	3	2	2	2	2	2	1	2	2	2	1	1	22	
	The Sport Fanatics	3	3	3	3	2	3	3	3	3	2	2	3	33	
	The Generals	3	2	3	3	2	3	2	3	3	3	2	2	31	
2	The Food Lovers	3	2	2	3	3	2	3	3	3	2	3	2	31	
	The City Dwellers	3	1	2	2	2	2	1	2	2	1	1	1	20	
	The Gymnomaniacs	3	2	3	2	3	3	2	2	3	2	3	2	30	
	The Head Chefs	3	2	2	2	2	2	1	2	3	1	1	1	22	
	The Sport Fanatics	3	3	3	3	2	2	3	3	3	3	2	3	33	
	The Generals	3	3	2	3	3	3	2	3	3	3	2	3	33	
3	The Food Lovers	3	2	2	2	2	3	2	2	2	2	2	2	26	
	The City Dwellers	3	2	2	2	2	2	1	2	3	2	2	2	25	
	The Gymnomaniacs	3	2	3	2	2	2	2	3	3	3	2	1	28	
	The Head Chefs	3	2	2	2	2	2	1	2	3	3	2	2	26	
	The Sport Fanatics	3	2	3	3	3	3	3	3	3	2	3	3	34	
	The Generals	3	3	3	3	2	2	3	3	3	3	2	3	33	
Total The Food Lovers		9	7	7	7	8	7	8	8	8	6	8	7	90	
Total The City Dwellers		8	5	6	6	6	5	3	6	7	4	4	4	64	
Total The Gymnomaniacs		9	6	8	6	7	7	6	8	9	8	7	5	86	
Total The Head Chefs		9	6	6	6	6	6	3	6	8	6	4	4	70	
Total The Sport Fanatics		9	8	9	9	7	8	9	9	9	7	7	9	100	
Total The Generals		9	8	8	9	7	8	7	9	9	9	6	8	97	

Two groups, The Sports Fanatics and The Generals, had scores greater than 97. Two groups, The Gymnomaniacs and The Food Lovers scored 86 and 90 respectively. The low achieving groups, The Head Chefs and The City Dwellers, scored less than 70 on the evaluation. For detailed results of each rater's evaluation see Table 8.

Group Interactions

This section will address the first question posed in this study: What kind of interactions occurred between group members in the process of completing a project-based learning task in a computer mediated learning environment? The results of the quantitative information provided with the content analysis of the online transcripts in both asynchronous and synchronous systems will be presented with interpretations. These results will be presented through a case-by-case description of the types of interactions occurring within the online dialog that fall under the major categories of problem solving, socio-emotional, and other. Once these results have been given, a cross-case analysis of these interactions will be presented that compares a high performing and a low performing group. Finally, a rudimentary analysis of the interactions present within each temperament type will be presented.

Interaction Frequencies within Groups

The Sports Fanatics (Asynchronous/Synchronous). This group, which consisted of four members, earned the highest project score (100) when compared to the other groups. Their primary mode of online communication was through the asynchronous system (64 total posted messages). One synchronous session was conducted between the planning and design phase of the project (319 lines of dialog in one session). Table 9 displays the frequency of interaction types across time. Figures 8-10 display the frequencies in chart format.

Table 9

Interaction Frequencies -- The Sports Fanatics

100		The Sports Fanatics					
		Planning		Design		Development	
Interaction Category		Asynchronous	Synchronous	Asynchronous	Synchronous	Asynchronous	Synchronous
Problem Solving							
Identify Problem		7	0	0	3	0	0
		29%	-----	0%	1%	0%	-----
Define Goals		6	0	4	22	1	0
		25%	-----	16%	7%	7%	-----
Act on Strategies		1	0	3	35	3	0
		4%	-----	12%	11%	20%	-----
Explore Strategies		4	0	7	102	2	0
		17%	-----	28%	32%	13%	-----
Look Back		0	0	0	10	0	0
		0%	-----	0%	3%	0%	-----
Total Problem Solving		18	0	14	172	6	0
		75%	-----	56%	54%	40%	-----
Socio-Emotional							
Shows Agreement		1	0	0	48	3	0
		4%	-----	0%	15%	20%	-----
Shows Antagonism		0	0	0	10	0	0
		0%	-----	0%	3%	0%	-----
Shows Disagreement		0	0	0	0	2	0
		0%	-----	0%	0%	13%	-----
Shows Solidarity		0	0	3	18	2	0
		0%	-----	12%	6%	13%	-----
Total Socio-Emotional		1	0	3	76	7	0
		4%	-----	12%	24%	47%	-----
Other							
Off Task Socio-Emotional		1	0	0	56	0	0
		4%	-----	0%	18%	0%	-----
Organizational		1	0	8	11	2	0
		4%	-----	32%	3%	13%	-----
Technical		3	0	0	4	0	0
		13%	-----	0%	1%	0%	-----
Total Other		5	0	8	71	2	0
		21%	-----	32%	22%	13%	-----
Grand Total		24	0	25	319	15	0

During the planning phase the majority of the dialog, or 75% of all messages, fell into the category of problem solving (See Table 9). The majority of these messages were of the identify problem and define goals (29% and 25% respectively) types. This high level indicates that the group used the system to exchange ideas concerning the theme of their project (identify problem) and for establishing the goals and objectives for the project. There were also messages posted that referred to explore strategies in 17% of the interactions that occurred. This suggests that the group made a quick decision about what they wanted to do for their project. There were an insignificant number (<5%) of interactions that were of the socio-emotional type. Early on there were three messages posted (13%) that revealed technical difficulties with the system. There was a high incidence of organizational interactions (8: 32%) during this phase of the project. Group members were learning how to use the online system and were using the asynchronous system to schedule both online and face-to-face meetings. The following is an excerpt of dialog between three members of The Sports Fanatics that occurred during the planning stage and contains interactions that represent the identification of a problem and goal setting.

Current Forum: Sports Fanatics- Group 4 - Module 1

Author: James

Subject: Re: Hey!

Are our objectives and nickmname due tomorrow? Are we going to stick with a sports theme for our web-page? We need to finalize a topic to outline our objectives. If we are going to stay with sports, then how about a page that highlights all sports in the SEC. Let me know what you think. Thanks

Author: Charles

Subject: Re: Hey!

hey lets all come up with a name and we can pick one tommorow in class. i think we should stay with the sports idea.

Author: Carole

Subject: Re: Hey!

Hey! Yeah I want to stay w/ the sports theme.. I like the idea of doing the teams in the SEC the web pages we picked have some great information we can use. I'm not sure about a name yet. Everything i think of sounds stupid. Sorry I couldn't get on

last night.. the site was full and wouldn't let me on. I'll try and think of some objectives and stuff and type it up when we get to class.

Author: Charles

Subject: Re: Hey!

hey everybody think of some ideas for tommorow so we can be ready for class, and make our report, see yall tommorow.

Author: Carole

Subject: Group Objectives

Ok.. we have all our stuff.. so let's hope it prints out.

Group name: SEC Gurus

Goals and objectives:

- 1)To inform people of the SEC Football information.
- 2)Football fans will be our Target audience.
- 3)To convey to our audience that the SEC conference is the best and hardest in the nation.
- 4)To allow people to learn about our conference teams.
To provide stats on players, teams, and coaches.
To help fans become familiar with their teams players.
To provide schedule and ticket information.
To provide information on each team's school, mascot, band, and other support groups.
- 5)Pictures, video, sound clips, trivia, jokes, statistics, surveys, where are they located, and comments on our page and their favorite or least favorite team.

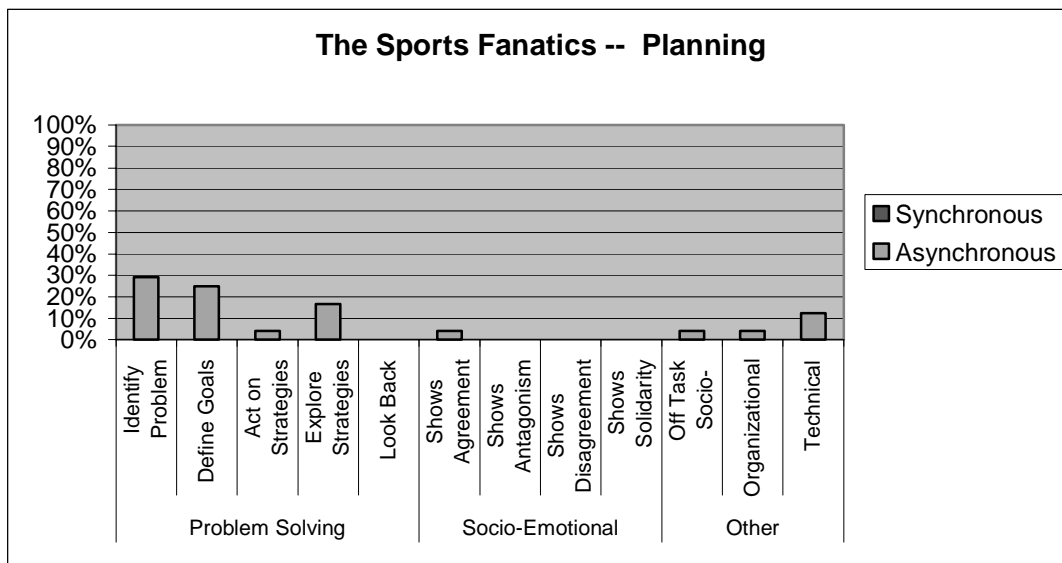


Figure 8. The Sports Fanatics – Planning.

Early in the design phase of the project the group participated in a synchronous session in which all group members participated. This was the only session that this group used this CMC system. They also continued to post messages to the asynchronous system during this phase of the project. Of the synchronous messages, 22 (7%) were posted indicating that some attention was still being given to the group's goals. However, the most frequent interaction occurring during this synchronous session consisted of statements that were of the type explore strategies (102: 32%). Thirty-five messages or 11% were of the act on strategies type, which indicates that this group used the synchronous system to brainstorm on the things they needed to do to begin developing their project. The coded dialog revealed 24% of the interactions were of socio-emotional category. Of these 48 (15%) were of the shows agreement type and 18 (6%) were of the shows solidarity type. This indicates that the group was beginning to show signs of support for each other and that they were using the online systems to do so. There was more off-task social dialog, as well (56: 18%) during the synchronous session. Using this system in the transition period from the first to the second phase might also indicate that the group used it to develop ideas and strategies that were not easy to do in the asynchronous system.

During the asynchronous sessions of the design phase, the interaction frequencies paralleled those of the synchronous session (See Table 9 and Figure 9). The exception to this was the lack of off-task social interactions, which occurred in the asynchronous system. The synchronous system appeared to be a more conducive vehicle at this phase of the project for social interactions that were not relevant to the project itself.

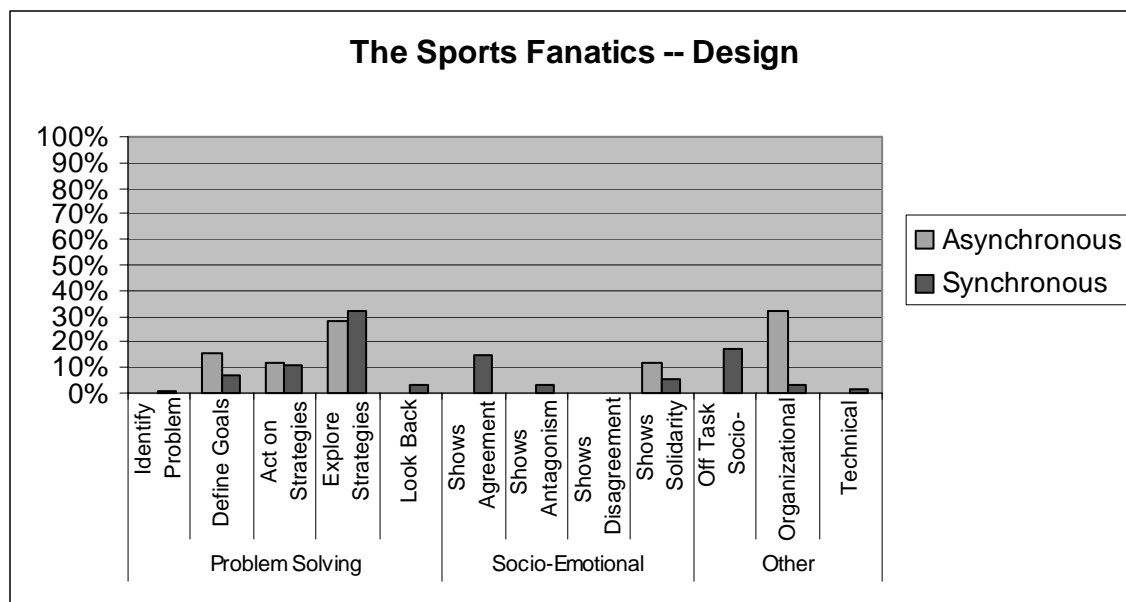


Figure 9. The Sports Fanatics – Design.

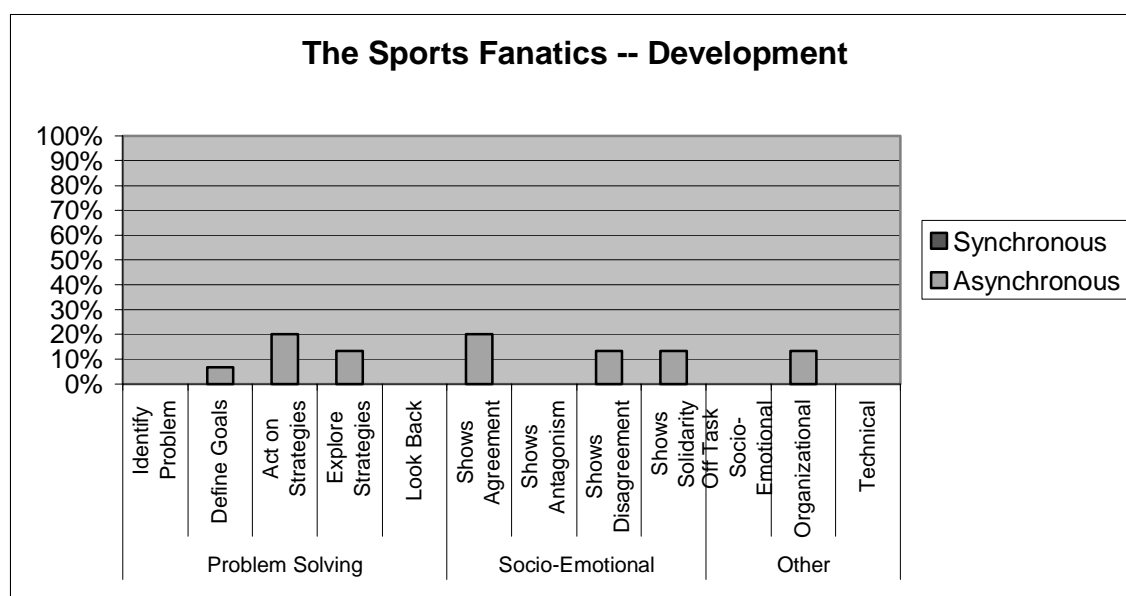


Figure 10. The Sports Fanatics – Development.

The final stage of the project, development, shows decreases in interactions that fall under the problem solving category and increases within the socio-emotional category. Problem solving interactions dropped from 54% to 40% and socio-emotional interactions increased from 24% to

47%. There were signs that some agreement and disagreement may have occurred during the development stage, indicating that group decision-making was taking place. Overall, as this group progressed the type of interactions occurring were consistent, well-balanced and prevalent.

The Food Lovers. This group consisted of three members, who used both asynchronous and synchronous systems. Their project was scored as being of average to above average quality (score of 90). This group used the synchronous system four times during the three phases of the project, once during the planning phase, once during the design phase, and twice during the development phase. Table 10 displays the frequency of interaction types across time. Figures 11-13 display the frequencies in chart format.

Sixty percent of the interactions during the planning phase were of the problem solving category (See Table 10). In the asynchronous system there were four occurrences of identify problem (16%), one of define goals (4%), six of explore strategies (24%), and three of act on strategies (12%). This indicates that the group utilized this system to begin solving the problem at hand, progressing through the necessary steps to accomplish the tasks necessary for completion of their project. There were only three (13%) socio-emotional interactions during the initial phase of the project. Over one-quarter (28%) of the statements posted to the asynchronous system fell under the category other. These included two statements that were off-task (8%), three that were organizational (12%), and two that were technical. There was one synchronous session during this phase of the project, where the statements were primarily off-task. This session was used to test out the system between two members.

The Food Lovers used both synchronous and asynchronous systems to complete the design phase. In the synchronous system problem solving interactions represented 62% of all interactions that occurred. Their problem solving statements (53%) within the asynchronous system were

primarily involved with exploring and acting on strategies (40%). Within the synchronous system strategies statements were equivalent (38%). There were higher levels of socio-emotional dialog in the synchronous mode than the asynchronous mode (21% versus 13%), including statements of solidarity that were not present in the latter. Again there were no indications of off-task statements in the asynchronous system, with 11% of the statements in the synchronous system falling under this type. The following excerpt of a synchronous session that occurred during the design stage of the project is a good example of the types of interactions that occurred within this group who utilized the Virtual Classroom extensively throughout the project.

11:08:40 AM: Simon> morning
 11:09:44 AM: Mary > so what are we doing
 11:10:30 AM: Simon> WE need to answer those questions
 11:10:41 AM: Mary > yep
 11:11:12 AM: Simon> 1. Shape the Solution
 11:11:28 AM: Simon> Present info so audience will benefit
 11:12:22 AM: Simon> Answer: Our information will be there for any LSU Faculty or student that wants it
 11:12:38 AM: Simon> and
 11:12:41 AM: Mary > interactive map
 11:12:53 AM: Mary > information about restaurants, pictures
 11:13:30 AM: Simon> it will help local restaurants as well as their customers
 11:13:43 AM: Mary > Anna has to go downstairs to get on her sister's computer
 11:13:47 AM: Simon> we can sell advertisement space to local restaurants
 11:14:14 AM: Mary > so now we are going to make money on this project! excellent!
 11:14:24 AM: Simon> we can, if we want to
 11:14:34 AM: Simon> but I think that should be a later concern
 11:14:41 AM: Mary > oh alright
 11:14:44 AM: Simon> but advertisements are apossiblity
 11:15:04 AM: Mary > I was a little confused on what they meant by "content"
 11:15:24 AM: Simon> What will our 'features' be?
 11:15:52 AM: Simon> the maps
 11:16:02 AM: Simon> and reviews
 11:16:17 AM: Simon> and pictures
 11:16:40 AM: Simon> Content...I think they mean our info
 11:16:51 AM: Mary > top restaurants of the week based on user information
 11:17:01 AM: Simon> good
 11:17:32 AM: Mary > that's what I thought but then they talk about media
 11:17:38 AM: Simon> for user reviews we can just use a message board

11:17:56 AM: Mary > yes
11:18:16 AM: Simon> Appropriate media and methods of deliver?
11:18:32 AM: Simon> Pictures...text...
11:18:38 AM: Simon> Video not necessary
11:18:43 AM: Mary > we talked about incorporating an excel spreadsheet for the survey to tally the responses
11:18:47 AM: Simon> audio not even needed
11:18:54 AM: Simon> Spreadsheet will work
11:19:11 AM: Simon> remember...we want to keep this simple
11:19:22 AM: Mary > I think we have to audio but definitely not video, not appropriate
11:19:36 AM: Mary > have to have audio
11:19:50 AM: Simon> what would we use as audio
11:20:05 AM: Mary > just background music, not sounds
11:20:49 AM: Simon> ok
11:20:52 AM: Simon> sounds good
11:21:18 AM: Mary > we could use different music based on the restaurant type
11:22:01 AM: Simon> I don't know if we can use that much audio
11:22:12 AM: Mary > will it take up too much space
11:22:19 AM: Simon> we are restricted to the amount of hard drive space right?
11:22:26 AM: Simon> no matter
11:22:31 AM: Simon> we will discuss in class
11:22:35 AM: Simon> next question
11:22:37 AM: Mary > we'll see what it will take
11:23:13 AM: Anna logged in
11:23:53 AM: Simon> we are on which question...
11:24:01 AM: Simon> are we done Media
11:24:50 AM: Mary > questions 2 and 3 seem to be the same thing
11:25:47 AM: Anna entered URL <http://.com/>
11:25:50 AM: Anna entered URL <http://.com/>
11:25:52 AM: Anna> k so i finally made it here....
11:26:07 AM: Mary > there goes that http thing again
11:26:14 AM: Anna> sorry
11:26:19 AM: Anna> i am doing NOTHING
11:26:22 AM: Mary > lol
11:27:01 AM: Mary > did you read through what we have typed already
11:27:26 AM: Anna> some what ... sounds good and i understand about space we just have no i dea...
11:27:44 AM: Simon> ok...How do we want our website to "look and feel"
11:28:03 AM: Anna entered URL <http://.com/>
11:28:05 AM: Anna> exotic.... techno ... crazy?
11:28:12 AM: Simon> Anna mentioned Tiger prints and LSU stuff
11:28:17 AM: Mary > informal, light, funny, fun to use
11:28:27 AM: Simon> since we are focusing on Places to eat around LSU
11:28:34 AM: Mary > incorporate school spirit
11:28:40 AM: Anna> yeah i like that The tiger school spirit all the way

11:28:48 AM: Anna> roar
11:28:51 AM: Mary > lol
11:29:06 AM: Simon> I figure we will let Anna have creative freedoms...since she is the design major
11:29:19 AM: Mary > Anna suggested using a tiger print background and a tiger mouth for our metaphoe
11:29:23 AM: Anna> no i need INPUT... #5 is alive
1:29:23 AM: Mary > *r
11:29:41 AM: Anna> oh yeah i need to scan that in and
11:29:50 AM: Anna> send it you guys
11:30:06 AM: Simon> Well..I guess question 4 could be answered....with eye appealing graphics
11:30:15 AM: Anna> Mary saw the print on thursday... and i picked up the drawing i was talking about
11:30:16 AM: Simon> nothing too "loud" or aggressive
11:30:44 AM: Anna> well?? tiger's are sly aggressive creatures... catch you by surprise
11:30:56 AM: Annaentered URL <http://.com/>
11:31:00 AM: Anna> pounce ... on you with out you knowing it
11:31:03 AM: Anna> keep the attention
11:31:42 AM: Anna> very intelegent animals. that would be are depth and breadth of info that we supply
11:31:47 AM: Mary > we don't want the background to drown the content
11:31:51 AM: Simon> good idea
11:31:56 AM: Anna> no we don't
11:31:59 AM: Simon> warm colors
11:32:11 AM: Mary > exactly
11:32:16 AM: Anna> yeah
11:32:26 AM: Simon> we can put pictures of some of the restaurants
11:32:43 AM: Anna> solid back ground with accents of tiger print and images
11:32:45 AM: Mary > I got a picture of the flower on the table at the faculty club
11:32:56 AM: Anna> did it come out alright
11:33:04 AM: Mary > haven't developed it yet
11:33:10 AM: Mary > got to finish that roll
11:33:14 AM: Annaentered URL <http://.com/>
11:33:17 AM: Anna> oh otay
11:33:21 AM: Simon> ok #5
11:33:22 AM: Mary > we will need to go out to eat again real soon
11:33:42 AM: Annaentered URL <http://.com/>
11:33:45 AM: Anna> how many .. do you want to take the pics of the restutraunts that are not only and things like that
11:33:56 AM: Annaentered URL <http://.com/>
11:33:59 AM: Anna> are you hungry ??
11:34:04 AM: Mary > not yet
11:34:19 AM: Mary > Simon said that Jackie's Seafood is actually a pretty nice place

11:34:26 AM: Anna> really
11:34:35 AM: Anna> we will have to atleast visit ...
11:34:38 AM: Anna> i guess
11:34:48 AM: Mary > info from users
11:34:48 AM: Anna> do we really have to visit all of the resturaunts?
11:35:16 AM: Simon> I don't think so...we can post links to their sites if they have websites
11:35:27 AM: Mary > age, major, sex, ratings of restaurants
11:35:29 AM: Anna> yeah
11:35:51 AM: Anna> do you want to use the chartwells survey
11:36:00 AM: Anna> for the ratings
11:36:18 AM: Mary > we can get ideas from that survey but I think we should make up our own
11:36:58 AM: Anna> k so do you want me to list thier stuff and then we can pick and chose
11:37:01 AM: Annaentered URL <http://.com/>
11:37:03 AM: Anna> choose
11:37:27 AM: Simon> We can put infor like hours the places are open..
11:37:32 AM: Simon> specialties
11:37:34 AM: Simon> etc
11:37:44 AM: Mary > yes, prices
11:37:54 AM: Anna> on the restu. info pages
11:37:55 AM: Simon> what about the Power point presetnation in there
11:38:13 AM: Mary > I am not sure what it is they want for the PP
11:38:13 AM: Anna> all i can thinkabout is how to use the site for new people
11:38:31 AM: Simon> good idea
11:39:19 AM: Anna> the site will be very user friendly but i really don't know what we can present as a pp
11:39:45 AM: Simon> we should keep it simple enough
11:40:07 AM: Simon> the pp presentation could be a featured couple of restaurants
11:40:12 AM: Simon> like top 3 or 4
11:40:18 AM: Simon> go in detail on them
11:40:21 AM: Anna> of the week
11:40:35 AM: Simon> yeah but of the week means we have to update often
11:40:44 AM: Anna> otay of the month
11:40:45 AM: Simon> of the month - better
11:41:08 AM: Anna> select on ratings from visitors
11:41:45 AM: Mary > if the spread sheet is implemented properly it should automatically update the users favorites
11:42:13 AM: Simon> that would be difficult to have a spreadsheet update a webstite
11:42:20 AM: Simon> we still ahve to update it
11:42:27 AM: Mary > ok
11:42:40 AM: Anna> that would be fine... somthing fun to do and keep up with our creation
11:43:05 AM: Simon> anything else we have to answer?

11:43:51 AM: Anna> so our ower point... feature websites
11:44:04 AM: Anna> and our ratings.
11:44:25 AM: Simon> i guess
11:45:04 AM: Anna> is everything clear ? Mary
11:45:34 AM: Mary > all but 2 b - what will be the best combination of media to use as the delivery system
11:46:11 AM: Simon> best combination would be simplicity
11:46:30 AM: Simon> just a regular point and click
11:46:58 AM: Mary > ok
11:46:58 AM: Anna> with images.. i thinki am still confused on that question... not too sure what they want to know
11:47:10 AM: Simon> yeah well...I think that does it for us
11:47:17 AM: Simon> is there anything else we have to do?
11:47:30 AM: Anna> i guess not
11:47:38 AM: Mary > I can type the paper unless someone else wants to
11:47:50 AM: Simon> paper?
11:48:00 AM: Simon> which paper?
11:48:04 AM: Anna> do you need someone else to
11:48:16 AM: Anna> all this info that needs to be typed up
11:48:18 AM: Mary > yes, we have to answer all these questions in a Word document
11:48:29 AM: Simon> read the top of your Module 2a paper
11:48:31 AM: Mary > and post it to the file exchange
11:48:38 AM: Mary > go to page 2
11:48:53 AM: Simon> "must be completed by using your group's online discussion board or chat room"
11:48:59 AM: Mary > go to page 2
11:49:01 AM: Simon> so we just finish ed it
11:49:13 AM: Simon> oh well

Table 10

Interaction Frequencies -- The Food Lovers

90		The Food Lovers					
		Planning		Design		Development	
Interaction Category		Asynchronous	Synchronous	Asynchronous	Synchronous	Asynchronous	Synchronous
Problem Solving							
Identify Problem		4	0	1	13	0	0
		16%	0%	7%	8%	0%	0%
Define Goals		1	0	1	20	0	5
		4%	0%	7%	13%	0%	6%
Act on Strategies		3	0	2	28	12	24
		12%	0%	13%	18%	40%	29%
Explore Strategies		6	0	4	32	6	4
		24%	0%	27%	20%	20%	5%
Look Back		1	0	0	5	0	1
		4%	0%	0%	3%	0%	1%
Total Problem Solving		15	0	8	98	18	34
		60%	0%	53%	62%	60%	41%
Socio-Emotional							
Shows Agreement		1	0	2	20	1	2
		4%	0%	13%	13%	3%	2%
Shows Antagonism		1	0	0	2	0	0
		4%	0%	0%	1%	0%	0%
Shows Disagreement		0	0	0	4	0	0
		0%	0%	0%	3%	0%	0%
Shows Solidarity		1	1	0	7	0	2
		4%	5%	0%	4%	0%	2%
Total Socio-Emotional		3	1	2	33	1	4
		12%	5%	13%	21%	3%	5%
Other							
Off Task Socio-Emotional		2	20	0	18	0	27
		8%	95%	0%	11%	0%	33%
Organizational		3	0	3	6	6	18
		12%	0%	20%	4%	20%	22%
Technical		2	0	2	4	5	0
		8%	0%	13%	3%	17%	0%
Total Other		7	20	5	28	11	45
		28%	95%	33%	18%	37%	54%
Grand Total		25	21	15	159	30	83

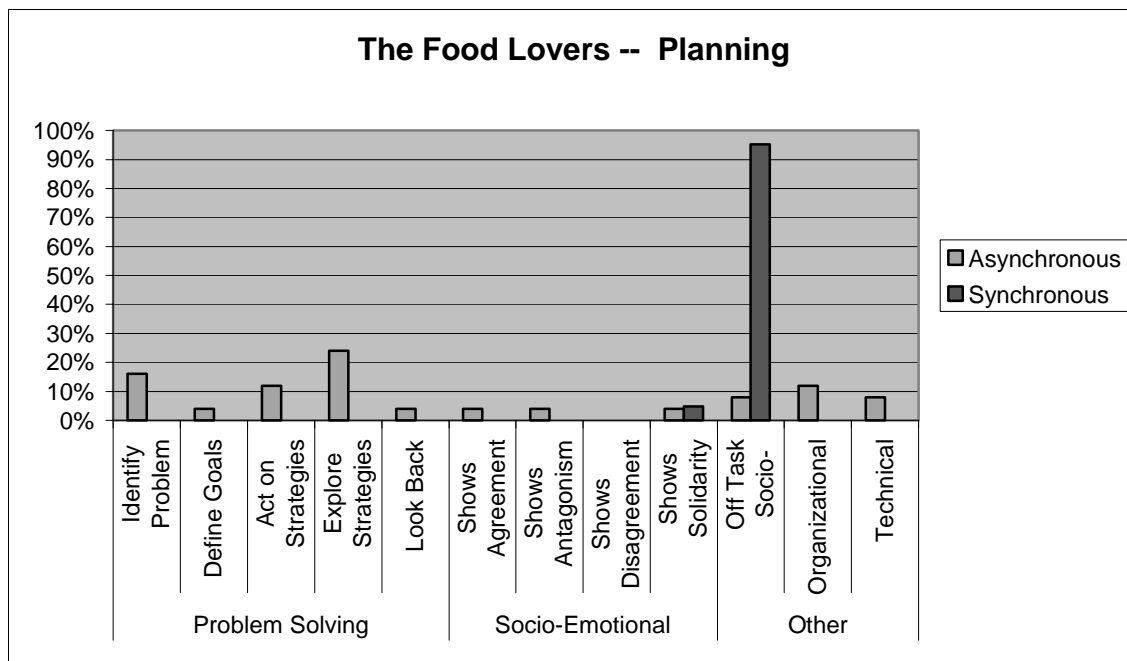


Figure 11. The Food Lovers – Planning.

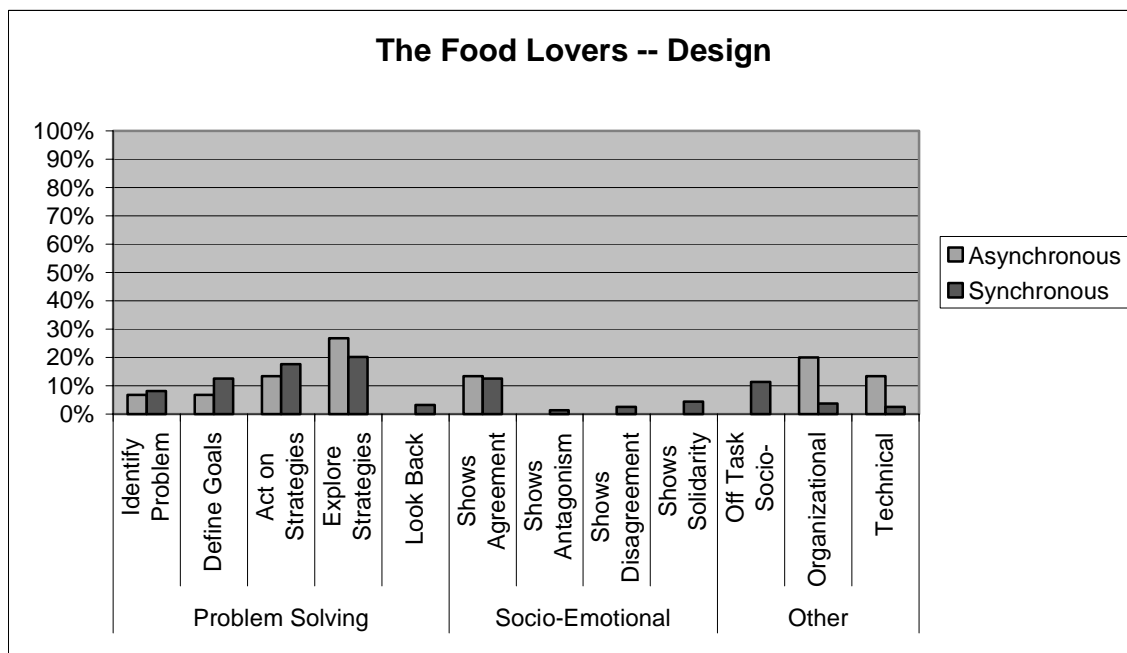


Figure 12. The Food Lovers – Design.

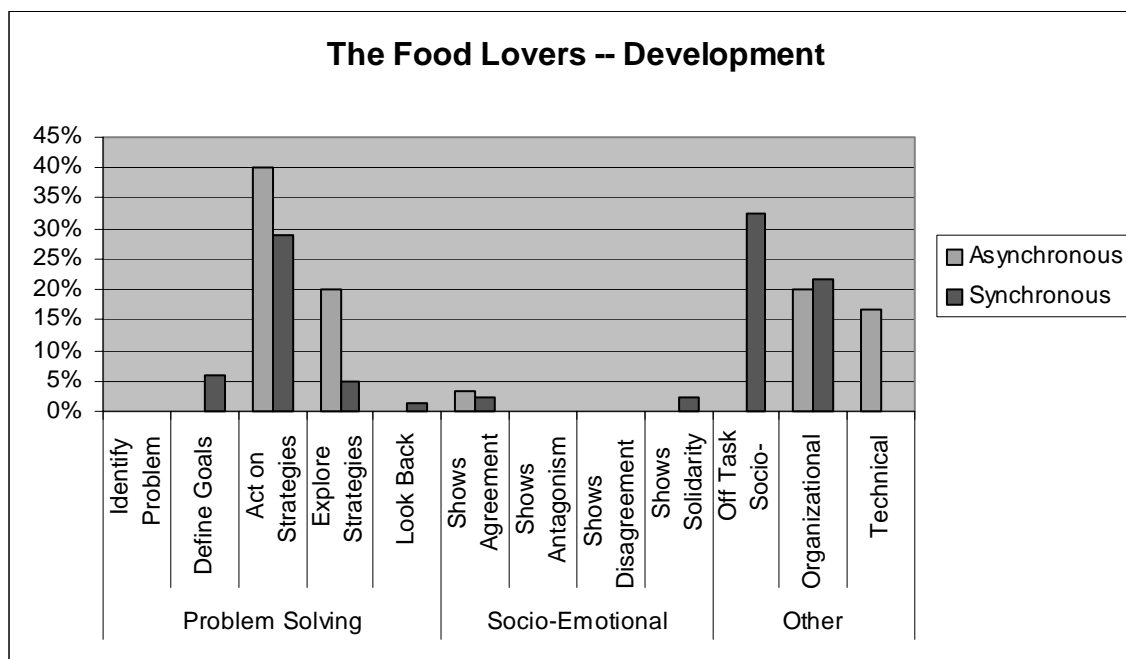


Figure 13. The Food Lovers – Development.

During the development phase of the project there was an increase in problem solving interactions (53% to 60%) within the asynchronous system and a marked decrease within the synchronous (62% to 41%). There was also a significant decrease in socio-emotional statements in both systems (asynchronous, 13% to 3%; synchronous, 21% to 5%). There was little change between the percent of other interactions between all phases of asynchronous communications (28% - 33% - 37%). Between the design and development stage the occurrences of off-task interactions increased from eighteen statements to twenty-seven (11%-27%). This may indicate that this session was not as productive as previous ones because of this increase and the decreases in both problem solving and socio-emotional dialog. This coupled with the increase in the total problem solving tasks exhibited within the development phase may indicate that this type of activity may be better served using asynchronous communications.

The Gymnomaniacs. This group had an average quality project (project score 86) and contained four members. Their communication through the first two phases of the project was

conducted using the asynchronous system. They used the synchronous system twice, at the beginning and end of the development stage. Table 11 displays the frequency of interaction types across time. Figures 14-16 display the frequencies in chart format.

The Gymnomaniacs' use of the asynchronous system for the planning phase of the project, consisted of dialog in which interactions were primarily associated with the problem solving and socio-emotional categories (48% and 36% respectively). Only 12% of the interactions were dedicated to identifying the problem and defining goals. The majority of their interactions in problem solving involved strategies (12% and 24%) with twice as many statements dealing with acting on the strategies than exploring. This is a significant difference considering that this is early in the process. Thirty six percent of the interactions were at the socio-emotional level. Of this most consisted of statements that indicated that some agreement was occurring (18%) and that there was some solidarity present (12%). There were also three messages (9%) posted that indicated that group members were meeting outside of the online environment. This may be the reason for the discrepancy above.

A striking lack of online participation occurred during the design phase of the project. During this time only ten messages were posted to the asynchronous system. Of these three were identify problem (30%), two were define goals (20%), and two were shows solidarity (20%). There were also two off-task interactions.

Table 11

Interaction Frequencies-- The Gymnomaniacs

86		The Gymnomaniacs					
		Planning		Design		Development	
Interaction Category		Asynchronous	Synchronous	Asynchronous	Synchronous	Asynchronous	Synchronous
Problem Solving							
Identify Problem		1		3		5	18
		3%	-----	30%	-----	15%	11%
Define Goals		3		2		0	3
		9%	-----	20%	-----	0%	2%
Act on Strategies		8		0		12	12
		24%	-----	0%	-----	35%	7%
Explore Strategies		4		0		0	1
		12%	-----	0%	-----	0%	1%
Look Back		0		0		0	4
		0%	-----	0%	-----	0%	2%
Total Problem Solving		16		5		17	38
		48%	-----	50%	-----	50%	23%
Socio-Emotional							
Shows Agreement		6		0		0	6
		18%	-----	0%	-----	0%	4%
Shows Antagonism		2		0		2	16
		6%	-----	0%	-----	6%	10%
Shows Disagreement		0		1		2	7
		0%	-----	10%	-----	6%	4%
Shows Solidarity		4		2		0	11
		12%	-----	20%	-----	0%	7%
Total Socio-Emotional		12		3		4	40
		36%	-----	30%	-----	12%	24%
Other							
Off Task Socio-Emotional		1		2		5	74
		3%	-----	20%	-----	15%	45%
Organizational		3		0		8	10
		9%	-----	0%	-----	24%	6%
Technical		1		0		0	2
		3%	-----	0%	-----	0%	1%
Total Other		5		2		13	86
		15%	-----	20%	-----	38%	52%
Grand Total		33		10		34	164

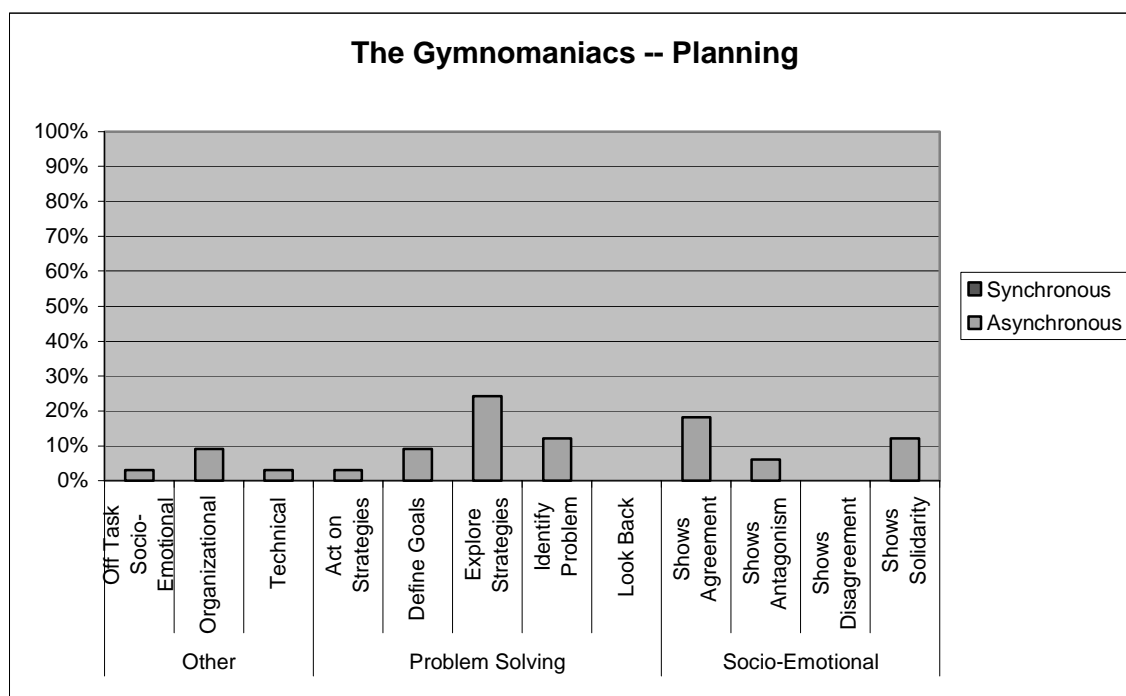


Figure 14. The Gymnomaniacs – Planning.

The development phase of the project showed some increase in online activity for this group. Asynchronous activity increased to planning stage levels (34 messages). The most significant finding here is that problem solving activities related to identifying a problem was higher than previous stages (5, 15%). However, there were no incidences of defining goals or exploring strategies. There was a high rate of organizational statements posted to the asynchronous system (24%). There was an early synchronous session in which there was some indication that defining goals and exploring strategies was present (8%). In their synchronous sessions there was a strong propensity for statements of the other interaction category. Seventy-four (45%) interactions were off task indicating that the session may not have been focused on the task at hand. The following interactions occurred during a Virtual Classroom session high incidences of off-task interactions.

12:29:50 PM: Melvin> hello
 12:30:12 PM: Melvin> to all the girls i've loved before
 12:30:26 PM: Melvin> who've traveled in and out my door
 12:31:02 PM: Melvin> listen up everybody, if you wanna take a chance
 12:31:20 PM: Melvin> justget on the floor and do the new kids dance
 12:31:31 PM: Elizabethlogged in
 12:31:44 PM: Elizabeth> Are you in the middle of a poem?
 12:31:50 PM: Melvin> hey eliza, dont tell Hanna i think she is a slacker group member
 12:32:13 PM: Melvin> where are you at right now
 12:32:36 PM: Elizabeth> Just wait until she sees that you posted that...
 12:32:43 PM: Elizabeth> She's going to be right back.
 12:33:08 PM: Elizabeth> I'm bored; what am I supposed to be doing?
 12:33:11 PM: Melvin> HANNA IS A SLACKER
 12:33:30 PM: Melvin> JSUT TALKING ABOUT HOW INTERESTING THIS CLASS IS
 12:33:36 PM: Melvin> HANNA IS A SLACKER
 12:34:05 PM: Melvin> ELIZA MAKE SURE HANNA DOESNT KNOW I THINK SHE IS A TERRIBLE GROUP MEMBER
 12:34:06 PM: Elizabeth> Hanna is very happy with you. What do you want to fix on our web- site?
 12:34:38 PM: Melvin> WHEN Hanna IS OUT OF OUR GROUP THE WEBSITE WILL WORK PERFECTLY
 12:34:56 PM: Melvin> ME YOU AND MELVINCARRY HER ASS
 12:35:02 PM: Elizabeth> I agree.
 12:35:19 PM: Melvin> IM JUST JOKING
 12:35:21 PM: Melvin> NOT
 12:35:28 PM: Elizabeth> Wait--I just meant that she's a jink. you type too fast.
 12:35:45 PM: Melvin> WHATS A JINK
 12:36:01 PM: Melvin> TELL HANNA I OWE HER A FROZEN COKE
 12:36:57 PM: Elizabeth> Good. Let's go to the Discussion Board and finish all of that stuff.
 12:37:13 PM: Melvin> YOU DONT THINK IT WILL BE EASIER RIGHT HERE
 12:38:25 PM: Melvin> MSUIC MAKES THE PEOPLE COME TOGETHER
 12:38:55 PM: Elizabeth> Hanna thinks that you're a geek. :-)
 12:39:17 PM: Melvin> DR. _____I WAS JOKING ABOUT HANNA BEING A SLACKER GROUP MEMBEER
 12:39:45 PM: Melvin> SHE HAS DONE A GREAT JOB CONTRIBUTING ON OUR WEBSIT
 12:42:08 PM: Elizabethlogged out
 01:02:50 PM: Melvin> mary ann and wanda were the best of friends
 01:02:54 PM: Peterlogged in
 01:03:03 PM: Melvin> all thriugh their high school years
 01:03:19 PM: Melvin> both members of the 4h club both active in the ffa
 01:03:43 PM: Melvin> after graduation mary an went out looking for a bright new world

01:03:57 PM: Elizabethlogged in
01:04:11 PM: Melvin> hey before Hanna gets in here lets bash her
01:04:22 PM: Elizabeth> I think that you have problems.
01:04:41 PM: Melvin> non problemo here
01:04:46 PM: Elizabeth> take that in the nicest possible way
01:04:54 PM: Simonlogged in
01:10:26 PM: Melvinlogged in
01:10:48 PM: Melvin> hello out there
01:11:10 PM: Melvin> ive been dating lisa now for little over a year
01:11:34 PM: Melvin> she says she hsnt been so happy but lisa live in fear
01:12:01 PM: Melvin> that one day day gonna find out that shes in love with a
brother from the streets
01:12:22 PM: Melvin> cuz i believe
01:12:28 PM: Melvin> that love is the answer
01:12:46 PM: Simonlogged in
01:13:03 PM: Simon logged in
01:13:14 PM: Elizabethlogged in
01:13:21 PM: Melvin> finally
01:13:32 PM: Peter> What's up
01:13:35 PM: Simonentered URL <http://.com/>
01:13:46 PM: Simonentered URL
01:13:49 PM: Elizabeth> thanks for fixing my computer...
01:14:09 PM: Simon> Hanna has joined
01:14:26 PM: Melvin> I think we need to change the spacing and tabs on the
classes and intramurals schedule pages

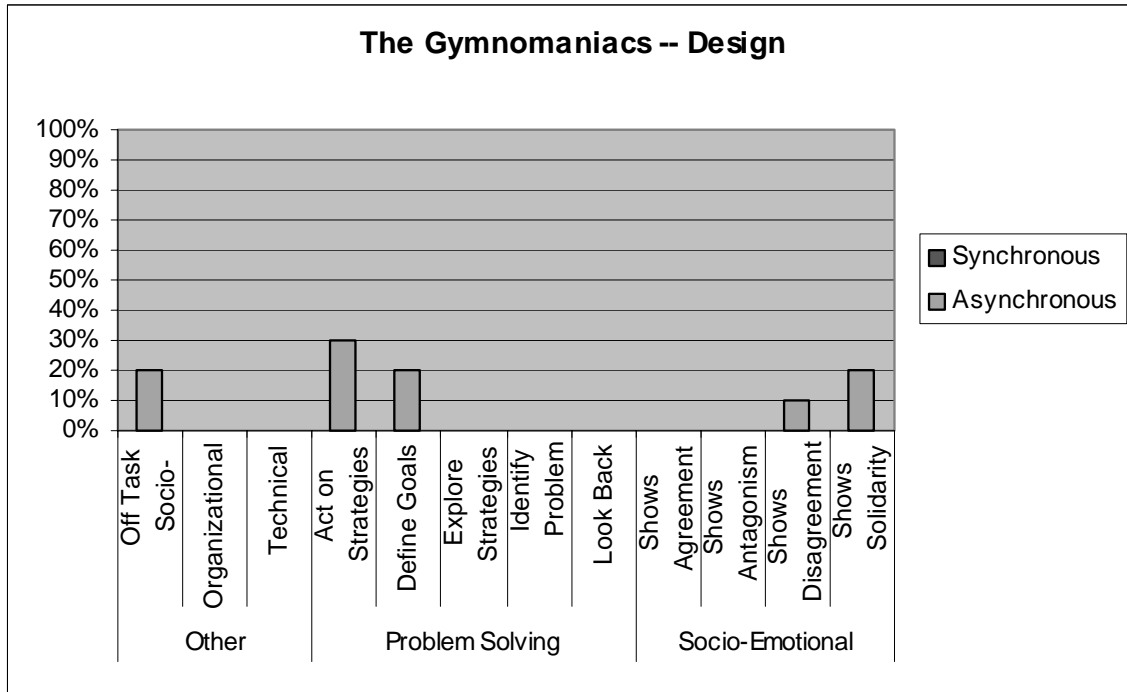


Figure 15. The Gymnomaniacs – Design.

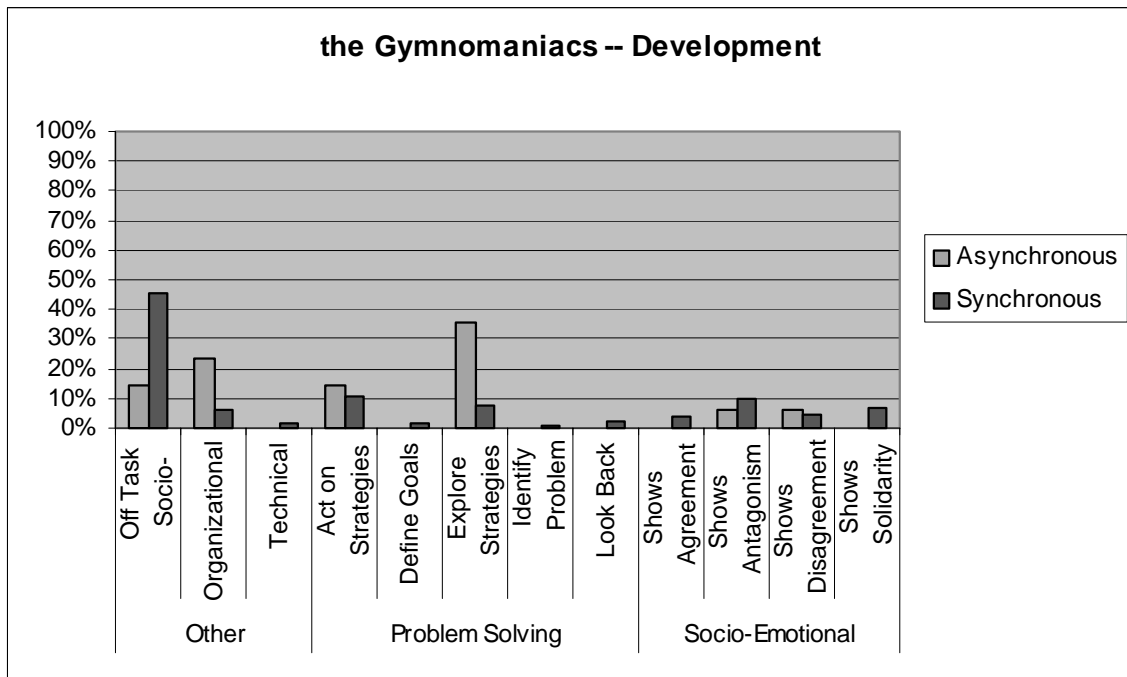


Figure 16. The Gymnomaniacs – Development.

The Generals. The Generals received the second highest project score of 96. Asynchronous CMC was the only system that this group used for online interaction. There were three members in the group. Table 11 displays the frequency of interaction types across time. Figures 17-19 display the frequencies in chart format.

Analysis of the interactions of the messages posted by the members of this group indicated that they used the system in the planning stage to primarily identify their problem and to define goals (29% and 10% respectively). There were some statements that were related to exploring strategies as well (16%). There were four statements that were analyzed as showing antagonism, in the form of apologies that were offered to other group members for being unable to complete a task necessary for the project when expected. There were also four statements that were related to organizational aspects of the project.

This group proceeded to the design stage of the project by addressing additional goals (21%) and statements of strategy were evenly distributed (29% each). There was only one statement pertaining to socio-emotional interactions during this phase. Four organizational statements were posted (14%) during the design phase.

In the development phase of the project this group continued to demonstrate high problem solving interactions (66%). At this stage there were no statements of identifying the problem or defining goals, which indicates that these issues had been resolved. There was some continuation of the exploration of strategies but the bulk of the messages (50%) were of the act on strategies type. Again this group showed low incidences of socio-emotional interactions, but there was some indication of antagonism again in the form of apologies for incomplete tasks. Twenty-four percent of all messages posted during this phase pertained to organizational statements.

Current Forum: The War Tigers - Group 2 -- Module 2b & c

Author: Cindy

Subject: what have you found

Just checking to see what yall have found for your portion of the research. And, I need to make sure that we are still meeting tomorrow (monday, 6th) at 11:30 in front of the CEBA computer lab downstairs.

Author: Jenny

Subject: Re: what have you found

I am planning on meeting on Monday still. I'll see ya'll then.

Author: Jenny

Subject: meeting this morning

I was outside of teh computer lab at 11:30, but I didn't see either of ya'll. I waited for about 15 minutes, but I had to go. I can meet later this evening if ya'll still want to meet, but I don't think that it is really neccessary. I was thinking that wecouldl all just submit our stuff to Cindy (if this is ok with you Cindy) over the file exchange and you could compile it because you have the zip drive and everything. I thnk that we should each be responsible for our own page:

Richard - Events Leading up to the war

Me - 3 major battles

Cindy - impact of the war

We need to submit our graphics and sounds to Cindy also. From what it looks like on the green sheet, this does not look too hard. I am going to keep working on my topic and I will check this later. Cindy let me know if you are ok with compiling it. if not I will go to a lab and do it tonight.

Author: Richard

Subject: Re: meeting this morning

I'm sorry I forgot all about that meeting, but that's alright with me if you all just want me to do my researsh and than transfer it. I will check this again after class (430).

Author: Cindy

Subject: Re: meeting this morning

that's fine I guess, since I have a zip drive.

Author: Jenny

Subject: Module 2b

I just found out that someone at my sorority house has front page on her computer. The only problem is that she does not have a zip drive. If ya'll think that I can just save it on a regular disk and transfer it onto a zip disk later, I can do everything for Modle 2b here. I am going to try to start it right now (4:00) Please send me your graphics and music so that I can do your pages too. I'm sure that Dr. _____

won't mind if we make a few changes after we turn it in if ya'll don't like what I do. Let me know if this sounds good.

Author: Richard

Subject: Re: Module 2b

That sounds like a good idea to me, but I still have some work to do. And I am a little confused as to exactly what I'm supposed to do with all my text stuff do I type up in word and cut and paste it later. Basically I'm confused as to what I am supposed to do with all my research. Talk to me.

Author: Jenny

Subject: Re: Module 2b

From what I understand, we do not need any of the reearch yet. Look at your green sheet. It shows an example of what is due tomorrow. It is basically just where we want to put everything on each page, not neccessarily the actual info. All I really need from you tonight is your graphics and any sound clips or video clips that you would like to use. I am just going to go ahead and do the formatting of each page. We can change it later if ya'll think of something better. You can either e-mail your graphics to me as an attachment or send them through the file exchange. I would really rather if you e-mailed them to me because I really do not know how to use the file exchange. I'll check this again in a little while.

Author: Richard

Subject: Re: Module 2b

I am emailing my graphics to you on @lsu.edu as of now I do not have any sound or video. If I find some appropriate clips I will put them in my page.

Author: Jenny

Subject: Re: Module 2b

Hopefully ya'll will check this again tonight, but I told you wrong earlier. We do need the text that we will be using in the website. If ya'll get this tonight please e-mail me your graphics, text, videos, and sounds. thanks

Author: Cindy

Subject: Re: Module 2b

I don't think you actually need the actual graphics, I think you just need to arrange where things will go. Say if we have three graphics each, we need to say where graphic one will go, and where graphic two will go. The same for the text. I have six graphics so far and a lot of text. Arrange it how you like, because I don't have front page. I am sorry for getting online so late, I had class all day and then had to work. I got to Ceba about 10-15 minutes late, and I looked all over for yall but didn't see yall anywhere. Sorry. I guess it doesn't matter now though.

Author: Cindy

Subject: Re: Module 2b

I'm not sure what we have to do either. I'll get back to yall in a few minutes, I've got some more to do too.

Author: Cindy
 Subject: Re: Module 2b
 Sounds much better. I'll try and send it to you.

Author: Cindy
 Subject: videos, etc.
 I haven't found any videos or animations yet. I did find the gettsburg address though (in print), and I am going to try and get my husband or my dad to record it.

Author: Cindy
 Subject: reloading new information
 Jessica can you re-upload the folder for the website. I think there are new graphics that are on your disk but not uploaded onto the discussion board (the graphics from when we met on Thursday). I'll try to e-mail you just in case you don't check the discussion board before tommorrow

Author: Jenny
 Subject: Re: reloading new information
 I reloaded the zipped file and all of the new pictures should be on there. I also need you to e-mail or upload the pictures that you used for your page. I am in class right now and we are not doing anything. Everybody is just working on their pages. Are we going to meet on Thursday?

Author: Richard
 Subject: Re: reloading new information
 Sorry that I was not able to make class on Tuesday I've been sick I think we should meet Thursday.

Author: Jenny
 Subject: Re: reloading new information
 Let's definetly plan on meeting on Thursday at 12:00 outside of the Ceba lab to make sure that we have verything together.

Author: Cindy
 Subject: Re: reloading new information
 yes, meeting on thursday sounds good. I was sick also. I will also send the pictures that I used to you. Well, I guess since it's late, I'll just give them to you tommorrow.

Author: Cindy
 Subject: Thanksgiving Holidays
 You mentioned in an email to me about getitng done before the holidays, I think it's due before then. It's due in final form, except being published, on Tuesday the 21st, the holidays start on the 23rd. It needs to be done by then, I think. I think we pretty

much have it done except for downloading music clips from the net, and adding any movie clips, or animations, and free software. That sounds like alot, but the majority of the info. is there.

Author: Cindy

Subject: what have you found out?

Did either of you find out how to insert the powerpoint? What about putting in free downloads, and about saving sounds to your disk. If you haven't found a way to do that, I found an alternate way. First see if the computer you are on has a microphone hooked up and working. Then, go to ccessories>entertainment> sound recorder. If you are on the internet make sure that both windows (sound recorder and internet) are visible at the same time. Click on record on the sound recorder while holding it up to the speaker of the computer, then play the sound on the computer from wherever it is. You may have to press record again if the sound is louder than the amount of time the recorder records. If you press record at the end of the time, it will continue recording and add more time to the recording. You can edit the sound in sound recorder (take out silent seconds, loop it, etc.). You may have to record the sound several times to get what you want. when you are done just go to file> save as> and save it on your disk. If you find anything out, just post it here or email me.

Table 12

Interaction Frequencies -- The Generals

97		The Generals					
		Planning		Design		Development	
Interaction Category		Asynchronous	Synchronous	Asynchronous	Synchronous	Asynchronous	Synchronous
Problem Solving							
Identify Problem		9		0		0	
		29%		0%		0%	
Define Goals		3		3		0	
		10%		21%		0%	
Act on Strategies		2		4		19	
		6%		29%		50%	
Explore Strategies		5		4		6	
		16%		29%		16%	
Look Back		0		0		0	
		0%		0%		0%	
Total Problem Solving		19		11		25	
		61%		79%		66%	
Socio-Emotional							
Shows Agreement		2		0		1	
		6%		0%		3%	
Shows Antagonism		4		0		3	
		13%		0%		8%	
Shows Disagreement		0		1		0	
		0%		7%		0%	
Shows Solidarity		1		0		0	
		3%		0%		0%	
Total Socio-Emotional		7		1		4	
		23%		7%		11%	
Other							
Off Task Socio-Emotional		1		0		0	
		3%		0%		0%	
Organizational		4		2		9	
		13%		14%		24%	
Technical		0		0		0	
		0%		0%		0%	
Total Other		5		2		9	
		16%		14%		24%	
Grand Total		31		14		38	

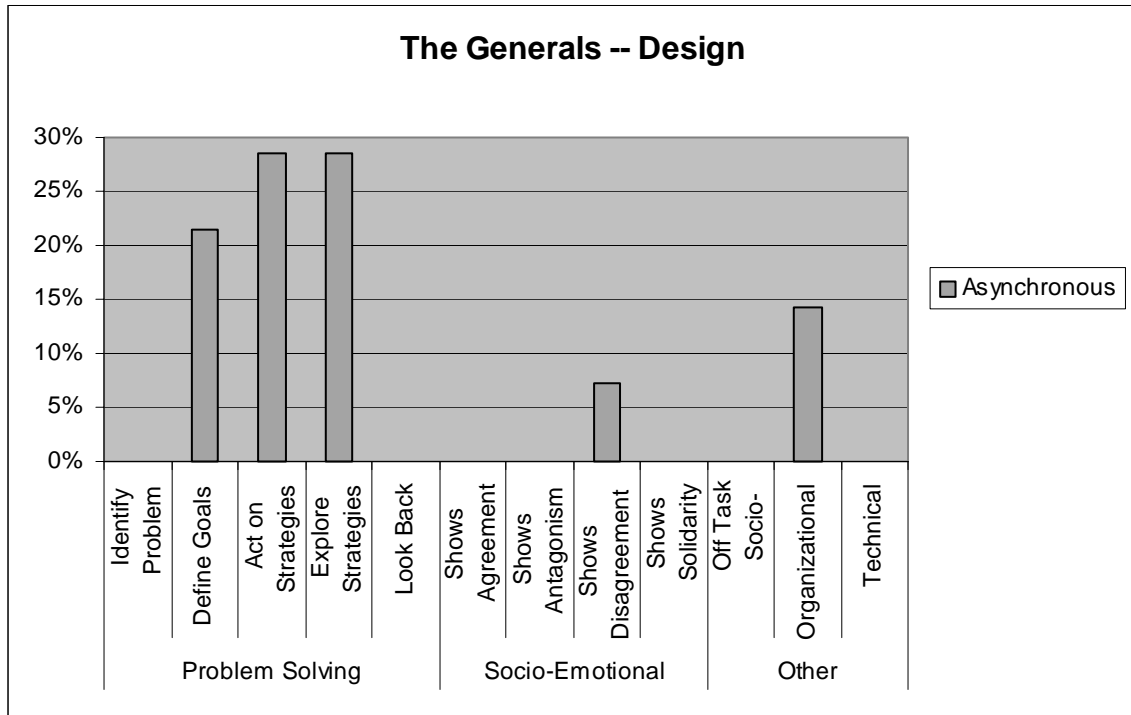


Figure 17. The Generals – Design.

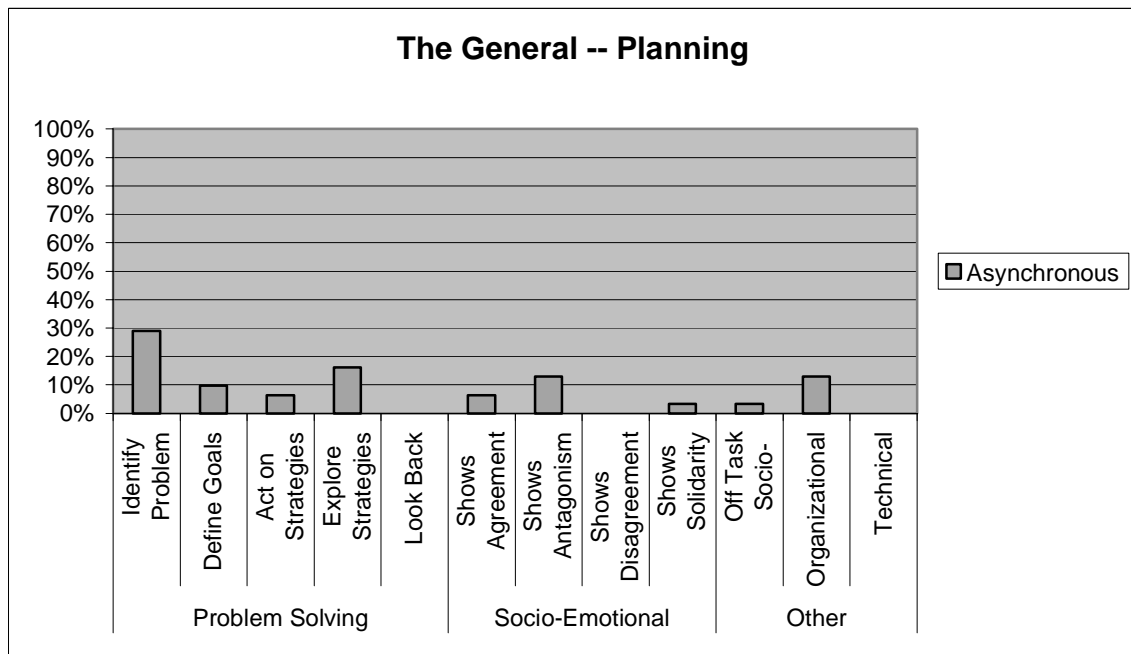


Figure 18. The Generals – Planning.

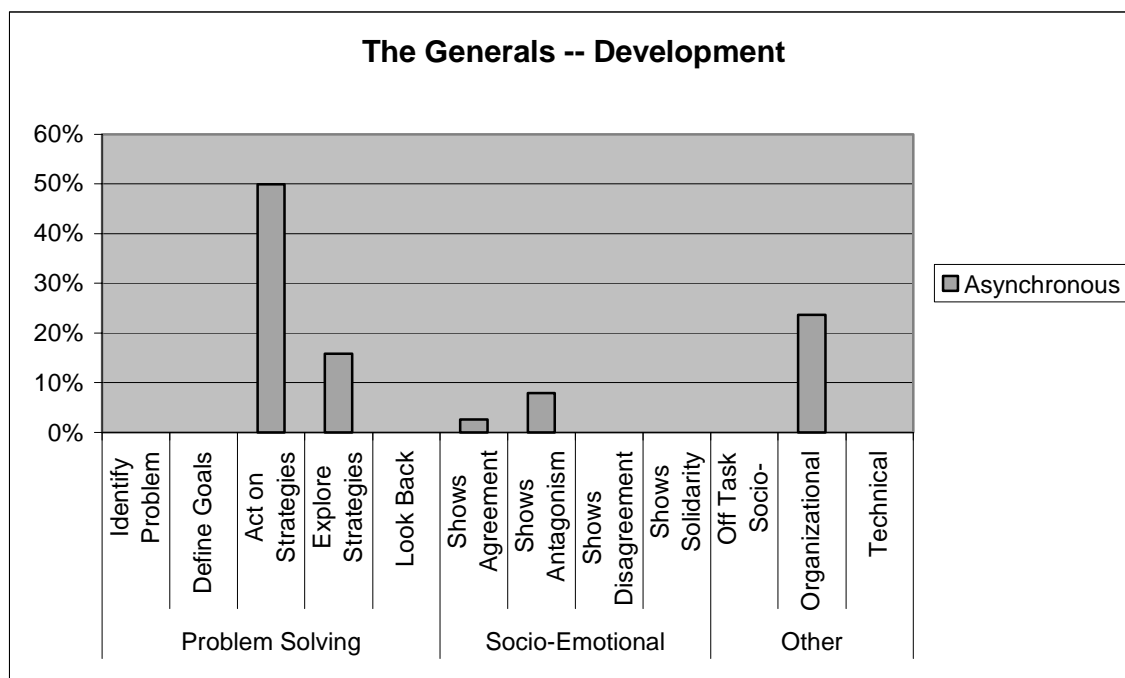


Figure 19. The Generals – Development.

The Head Chefs. The Head Chefs, a group of four members, was one of two groups that scored less than 80 on the evaluation of their project. This group exclusively utilized the asynchronous system to interact online. Table 13 displays the frequency of interaction types across time. Figures 20-22 display the frequencies in chart format.

During the planning and design phase this group used the CMC system infrequently. Their total message count for these two stages was 27. During the planning stage the group posted three statements identifying a problem for 23% and five defining goals for 38%. There were also four statements that explored strategies for solving the problem. No messages were posted for the socio-emotional or other categories.

Table 13

Interaction Frequencies -- The Head Chefs

70		The Head Chefs					
		Planning		Design		Development	
Interaction Category		Asynchronous	Synchronous	Asynchronous	Synchronous	Asynchronous	Synchronous
Problem Solving		3		0		0	
Identify Problem		23%		0%		0%	
		5		2		0	
Define Goals		38%		14%		0%	
		1		5		21	
Act on Strategies		8%		36%		40%	
		4		3		4	
Explore Strategies		31%		21%		8%	
		0		0		0	
Look Back		0%		0%		0%	
		13		10		25	
	Total Problem Solving	100%		71%		47%	
Socio-Emotional							
Shows Agreement		0		0		0	
		0%		0%		0%	
Shows Antagonism		0		1		7	
		0%		7%		13%	
Shows Disagreement		0		0		0	
		0%		0%		0%	
Shows Solidarity		0		3		5	
		0%		21%		9%	
	Total Socio-Emotional	0		4		12	
		0%		29%		23%	
Other							
Off Task Socio-Emotional		0		0		8	
		0%		0%		15%	
Organizational		0		0		8	
		0%		0%		15%	
Technical		0		0		0	
		0%		0%		0%	
	Total Other	0		0		16	
		0%		0%		30%	
	Grand Total	13		14		53	

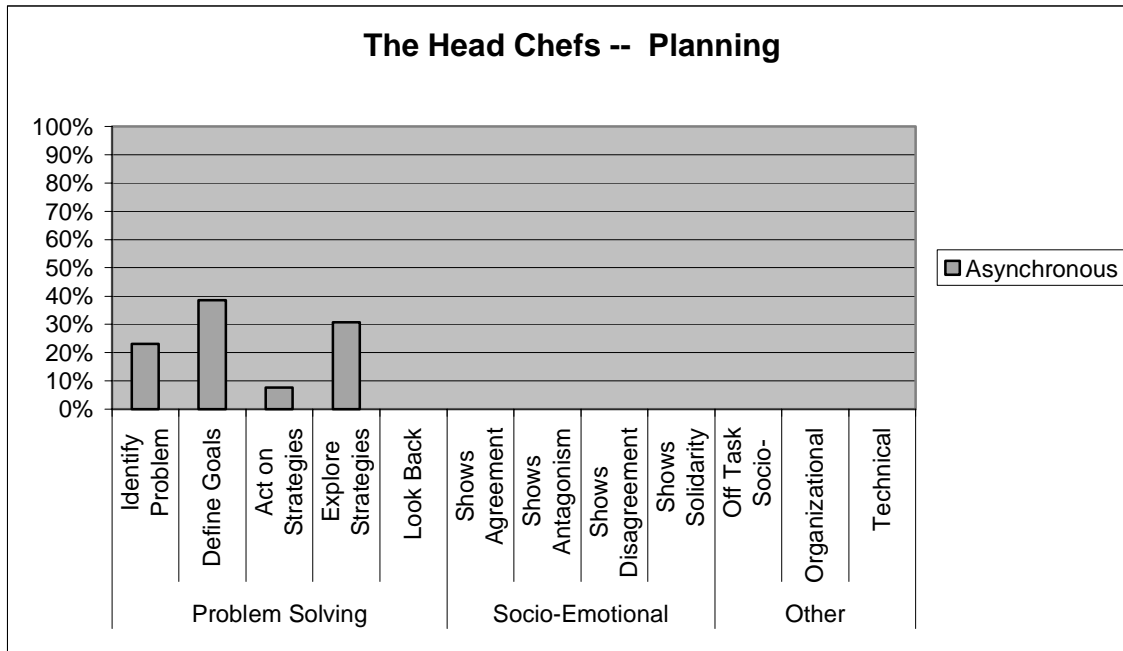


Figure 20. The Head Chefs – Planning

The design stage proceeded through the problem solving process as the group defined more goals (two messages – 14%), explored strategies (three messages – 21%), and acted on these strategies (five messages – 38%). There were also three messages (21%) for shows solidarity.

During the last stage the group doubled their output over the first two phases from 27 to 53 messages posted. The development stage was dominated by the strategy types under problem solving with 21 messages or 40% being of the act on strategies type. There was also socio-emotional interactions posted, that were not present in earlier phases. Seven messages (13%) of the shows antagonism type were posted, primarily with group members apologizing for not completing tasks in a timely manner. There were also five messages posted (9%) that showed solidarity. In the other category eight off task messages and eight organizational messages were posted for a total of 30% of the total messages. This did not occur during previous phases. This group seemed to be slow to start in the online environment.

Current Forum: The Head Chefs - Group 6 -- Module 2b & c

Author: Melanie

Subject: restaurants

went to tj ribs and to sullivan's. got menu for each. tj ribs does not have a website, but sounds like they would be helpful in getting us anything we need. sullivan's doesn't have a website either, but they are getting one through their national company site. it is not up and running yet, but they will have one in the near future. they also seemed very helpful, even though i was definatley not dressed for the occasion.

well, we will discuss at the chimes.

Author: Jeff

Subject: restaurants

I went by Juban's and their website is getting kicked off. I have a menu from them and I will be going to DiNardo's this Friday to get a menu from them. See you guys at the Chimes.

Author: Jeff

Subject: Don't forget the Chimes

Don't forget that we will meet at the Chimes this afternoon around noon. See you guys there

Author: Jeff

Subject: great lunch

ya'll,

Had a good time at lunch. We did get a good bit accomplished. Storyboard layout looks great. Remember to get those menus and try and have them before tuesday. You may even be able to call the places and have them fax them over to you so you don't have to drive there. See you on tues and go tigers...BEAT BAMA!!!

Author: Jeff

Subject: Tuesday's assignment

Does anyone have frontpage express? I have the complete frontpage and I don't know if the assignment can be done on the complicated one. Let me know.

Author: Simonn

Subject: Re: Tuesday's assignment

_____said in class you could use the full version of frontpage for the assignment but when you use the express version in class a few of the features will not be able to be used. But it shouldn't cause a real problem. We will see in class Tuesday. Later man.

Author: Simonn

Subject: Misson: Complete

Hello team. I had a good time @ Chimes Thursday. Good food and got a lot of work done. Got a lot of ideas out in the open. I also got the menus i needed. Unfortunately i haven't received the full version of frontpage like i said i would. I was kinda distracted with the great football action this weekend. How bout dem TIGERS!!!! That was a GGGGRRREEAATT game! And i just got finished watching the Saints beat the hell out of the 49ers. Also a great game. Hope y'all had fun this weekend. See y'all Tuesday.

Author: Jeff

Subject: LA Sports teams kicking ass

I always like it when Louisiana teams win. Tigers Win, Saints Win!!! See you tuesday

Author: Bill

Subject: Re: Misson: Complete

hey group, chimes was a great idea. I got to know ya'll alot better. I got the menus that I was suppose to get. We should meet somewhere every Thursday because that is when we get the most work done. The football game was great. I have alot of new ideas and I cannot wait to share them with you. See you tom.

Author: Jeff

Subject: Re: Misson: Complete

Brad,

I agree. The game was great and Thursdays would be a good idea. We'll talk about it more this aftrenoon.

Author: Melanie

Subject: tuesdays asssignment

great lunch at the chimes! i don't have frontpage express on any computers i have access to. except for maybe ceba lab. i already got my menus from tj ribs and sullivan's. if you need me to do anything else just say so.

Author: Melanie

Subject: sick

hey guys,

i am not going to be at class today. i have a really important doctors appt. that i have to go to and the only time i could go is one o'clock. just email me or post on the discussion board what you need me to do.

Author: Simonn

Subject: sorry guys

sorry guys I couldn't make because my brothers car broke down and I had to miss all my classes to go get him. Please tell me what went on and what we decided to do. Later guys. GO TIGERS!!!

Author: Jeff

Subject: thursday meeting

Lets all meet at noon at the library to divide up things that will need to be done. Bring any menus that you have picked up from the restarurants assigned. We can just meet in the front and then find somewhere to work. If you have any questions just post them.

Missy, Jessica said you have a mouth full of ulcers. Sounds fun. Hope you are feeling better.

Author: Jeff

Subject: Don't forget about Thursday

Guys don't forget about the meeting this thursday in front of the Libraby. We'll assign specifics about the webpage. See you then.

Author: Bill

Subject: Re: Don't forget about Thursday

I got really sick and i have been in bed all day. Sorry about not meeting you'll. More bad news. Jarvis could not come through with the tickets. I found out last night. If anything pops up I will let you know. Sorry again. I will try to contact you at your house to see what I missed.

Author: Jeff

Subject: Pages to do

Guys,

Don't forget to get your pages to me by wedensday. Remember to do it using frames with the top frame, frame running down the left side, and the frame in the middle. This will make it a little easier to work with. Also, your page needs your menu and a map. You can get the map from yahoo maps or mapquest.com. Keep me posted on things and post the pages you guys complete on the file exchange board. Thanks.

Author: Jeff

Subject: Go to Hell Ole Miss go to Hell!!

Hey guys,

I hope that the weekend was good for you all, Ole Miss was awesome. Remember to try and get those completed pages to me by Wednesday so that I can link them all together on the homepage. If you guys have any suggestions let me know. Remember to try and post them via the file exchange part of blackboard. See you guys Tuesday and pray for a Bama Victory this weekend (this will be the only time we will allow prayers for Bama).

Author: Melanie

Subject: web pages

trying to finish the web pages to turn in to Jeff. it is kind of difficult having never used this program before but i think that it will turn out fine. i will see ya'll in class tommorrow.

Author: Jeff

Subject: message to brad

I just got your message on my cellphone. The battery was dead and I had to charge it last night so I didn't have it with me. The things that you need to do are 2 webpages one for each of the restaurants you were assigned. You need to have a map (which you can get via yahoo maps or mapquest) and the menu. You need to post them using the file exchange so that I can link them all to the homepage. See you in class and let me know if you have any other questions.

Author: Bill

Subject: Re: message to brad

Jeff, could not make class today due to a managemaint project. I tried to get in touch with you but we were playing phone tag. I need to meet up with you to go over some things in class about our project. I am working on our project now but i need to talk to you. Call me,

Author: Jeff

Subject: Re: message to brad

I 'll give you a call on thursday evening. I have to work tonight and I don't know what time I'll be home.

Author: Simonn

Subject: project status

Hey guys and gal. Sorry I can't make class today. So many projects, So little time. I stayed up till 5 A.M. this morning working with a group for a project in Mgt. 4113. I feel Like a zombie. I'm working on our project right now. And I have a couple of other project I have to work on today so i have to miss class. Sorry I have to miss again Please let me know how y'all are coming on the pages and what happened in class. Talk to y'all later.

Author: Melanie

Subject: Re: project status

totally understand Simon. thanks Jeff for helping figure out how to work frontpage a little better. I have downloaded many images that i want to use as a backround for my pages. i should be done my pages by this weekend b/c i have an office visit all day wednesday and a very impt. test on saturday. so, see ya'll later.

Author: Bill

Subject: Re: project status

I MISSED CLASS THE SAME REASON YOU DID SIMON. Sorry about missing class missy. I already talked to Jeff. I am working on our project as we speak. All of my teachers are giving me all of this stuff that is due. No sweat it will get done. Along with this project. See ya'll Thursday.

Author: Simonn

Subject: Re: project status

yea guys and gal. Projects suck. But I will have the pages ready hopefully by tomm. but maybe by thursday. What went on in class today? See y'all later.

Author: Jeff

We didn't do much but surf the net for pics and backgrounds. Don't forget to use file exchange to send pages.

Author: Jeff

Subject: TROUBLE WITH FRAMES

Guys,

If you are having problems with the frames, just design something that you feel will work better. The frames have been giving me a little bit of trouble. Let me know if this is easier for you. In fact, call me 555-5555 and I'll help you out. Also, if everyone can post their phone number it will be easier if problems should arise b/c not everyone is at a computer all the time.

Author: Melanie

Subject: webpages

i am sending the pages i have done through the file exchange. i can't figure some things out, like how to hyperlink the pages together. but other than that, it is done.

Author: Jeff

Subject: Re: webpages

thanks missy. I'll link the pages together. Brad and Simon, don't forget about posting your pages through file exchange.

Author: Melanie

Subject: other restaurants

i forgot to put similar restaurants on my pages i sent you. i think for tj ribs, some similar restaurants are outback, chilis, and logans roadhouse, lonestar steakhouse. for sullivan's, you would like ruth chris steakhouse, j alexanders, mansurs. so if you need to add these things or want me to just say so.

Author: Jeff

Subject: Re: other restaurants

I got it. Also, this is just a prototype for the real thing.

Author: Bill

Subject:

i gave up on trying to contact you. I just got finished with my project. some things would not pop up when i went back and clicked on them. I saved everything to a disk. I could not scan the menus. Had problems. call me or e mail me if you want to meet up before class to take care of this.

Author: Jeff

Subject: Re: coco

I just tried to call you but I have been busy with this project and other classes. If you call tonight, call my cell 555-5555 b/c I'll be posting things and my phone line will be tied up.

Author: Jeff

Subject: Pissed b/c things don't work

Hey guys,

I have been trying to link everything to the homepage but nothing seems to be working. It's 2 am now and I've been working on this since 10:30pm and some this afternoon also. I posted my stuff to the file exchange and so did brad so I'm going to see if _____ can give me a hand.

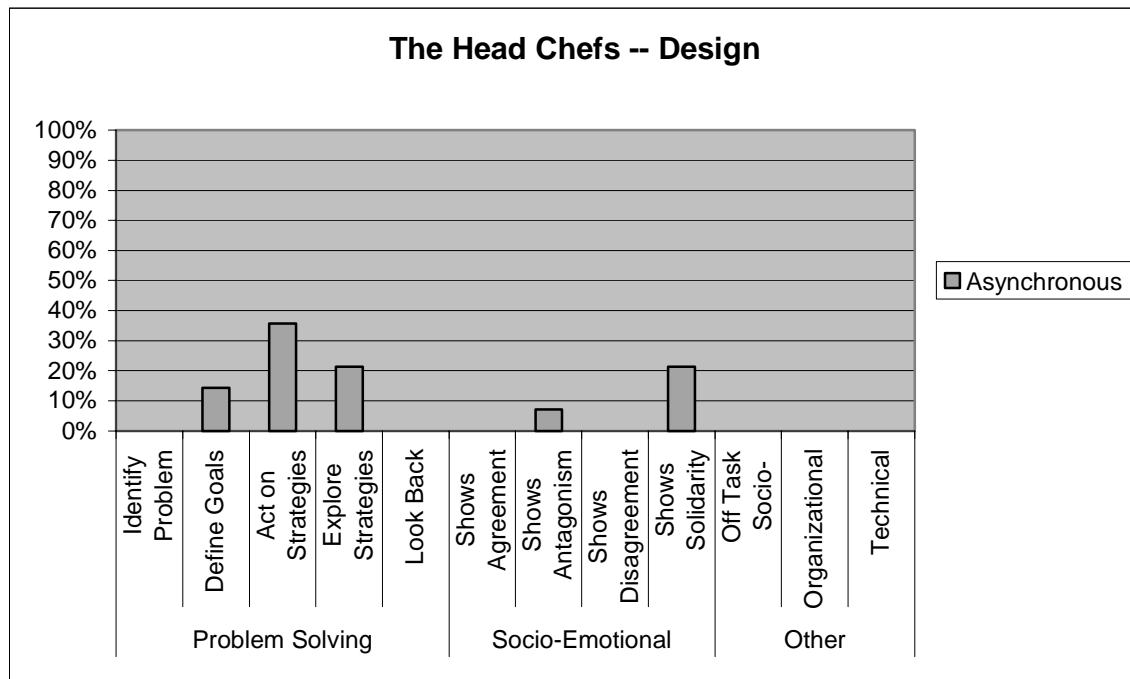


Figure 21. The Head Chefs – Design.

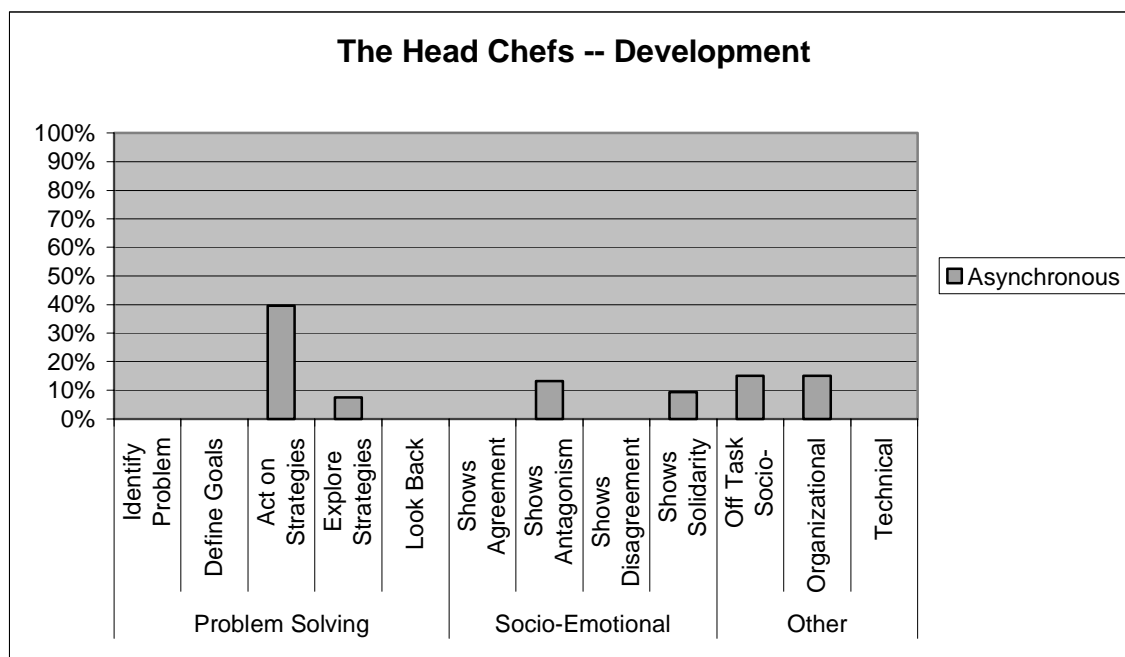


Figure 22. The Head Chefs – Development.

The City Dwellers. This three member group produced the weakest quality project scoring a 64 on the evaluation. Their only utilization of the CMC systems was through asynchronous communications. Their total posted messages combined was 38. Table 13 displays the frequency of interaction types across time. Figures 20-22 display the frequencies in chart format.

This group's participation in online communication was minimal at best. The total number of messages posted reflects their lack of involvement in online communication. One of the reasons this group's low numbers is that during this period one group member was unreachable and another rarely attended regularly scheduled classes. Of the seven messages posted during the planning stage three were identify problems, one was define goals, and two were explore strategies. There were no socio-emotional interactions and one technical statement posted.

During the design stage, there again was low involvement by the two available group members. Of the four problem solving messages one was define goals, one was explore strategies, and two were act on strategies. There were three show antagonism messages, which were of the

apologetic nature for not completing assigned tasks on time. During the development phase the third member became involved in the online interactions, causing the number to increase proportionately to 23. Of these messages nearly half (48%) were exploration of strategies, reflecting on the fact that this group got off to a slow start. Again there were apologies for being late on task completion.

Current Forum: The City Dwellers - Group 3 -- Module 2b & c

Author: Lori

Subject: website

I just looked at some city websites like kansas city. I'm getting some ideas.

Author: Lori

Subject: website

Lets do a list restraurants.

Author: Terry

Subject: Re: website

how about Chilis, Semolina's, Logan's, Copeland's, T.J. ribs, Ninfa's, DiAngelos

Author: Lori

Subject: Re: website

That sounds really good. I think we can get menus from all those places. It covers all types of food

Author: Lori

Subject: Tourist Attractions

What do you think are the big tourist attractions here in Baton Rouge

Author: Terry

Subject: Re: Tourist Attractions

The capital, gov. mansion, lots of plantations, uss kid, old state capital

Author: Terry

Subject: LSU fight song

I have the lsu fight song on my computer so we do not have to get it.

Author: Lori

Subject: Re: LSU fight song

Thats great. Maybe on the LSU page.

Author: George

Subject: Re: LSU fight song

I've got like 10 or 20 LSU songs on my computer. I think we should put like the best five maybe. I have that Hey Baby song EVERYONE loves. That definately has to get on it.

Author: Lori

Subject: Casinos

Two types of casinos.

Maybe whats there other than gambling. I don't know.

Author: Terry

Subject: Re: Casinos

that sounds good we can do a page on Argosy and one on Casino Rouge. I don't know of any other types of nightly entertainment there are for tourists.

Author: Lori

Subject: Tuesday

Lets meet to consolidate our stuff Tuesday at 8am in CEBA

Author: George

Subject: Re: Tuesday

I have class at 7:30 AM straight till ELRC class time. That's four classes in a row, can we meet tonight? Lauren, I called you the other night. Did you get my message? Please call me back when you get a chance.

Author: Lori

Subject: Form

I think the info we need to gather is: name

Place where their from

Maybe reason for coming here.

Author: Terry

Subject: Re: Form

We should also get their age,

Author: Lori

Subject: Re: Form

That good too. we will be able to see the demographics looking at our site. Email address would be another good thing

Author: Terry

Subject: Re: Form

sounds good

Author: George

Subject: Re: Form

Yea, that sounds good, too. I will post the powerpoint and the sound files. cya tomorrow.

Author: Lori
Subject: Re: Form
Thanks scott.

Author: George
Subject: meeting
Hey, when are we going to meet to finish this project before Tuesday? Is there anything you guys want me to do before we meet? Have a nice day!

Author: Lori
Subject: Re: meeting
I just got back from Phoneix. I haven't heard about meeting. Toni has everything on her Disk. I have to work till 4 on Monday so whenever is fine with me.

Table 14

Interaction Frequencies -- The City Dwellers

64		The City Dwellers					
		Planning		Design		Development	
Interaction Category		Asynchronous	Synchronous	Asynchronous	Synchronous	Asynchronous	Synchronous
Problem Solving							
Identify Problem		3		0		1	
		43%		0%		4%	
Define Goals		1		1		1	
		14%		13%		4%	
Act on Strategies		0		2		2	
		0%		25%		9%	
Explore Strategies		2		1		11	
		29%		13%		48%	
Look Back		0		0		0	
		0%		0%		0%	
Total Problem Solving		6		4		15	
		86%		50%		65%	
Socio-Emotional							
Shows Agreement		0		0		2	
		0%		0%		9%	
Shows Antagonism		0		3		2	
		0%		38%		9%	
Shows Disagreement		0		0		0	
		0%		0%		0%	
Shows Solidarity		0		1		1	
		0%		13%		4%	
Total Socio-Emotional		0		4		5	
		0%		50%		22%	
Other							
Off Task Socio-Emotional		0		0		1	
		0%		0%		4%	
Organizational		0		0		2	
		0%		0%		9%	
Technical		1		0		0	
		14%		0%		0%	
Total Other		1		0		3	
		14%		0%		13%	
Grand Total		7		8		23	

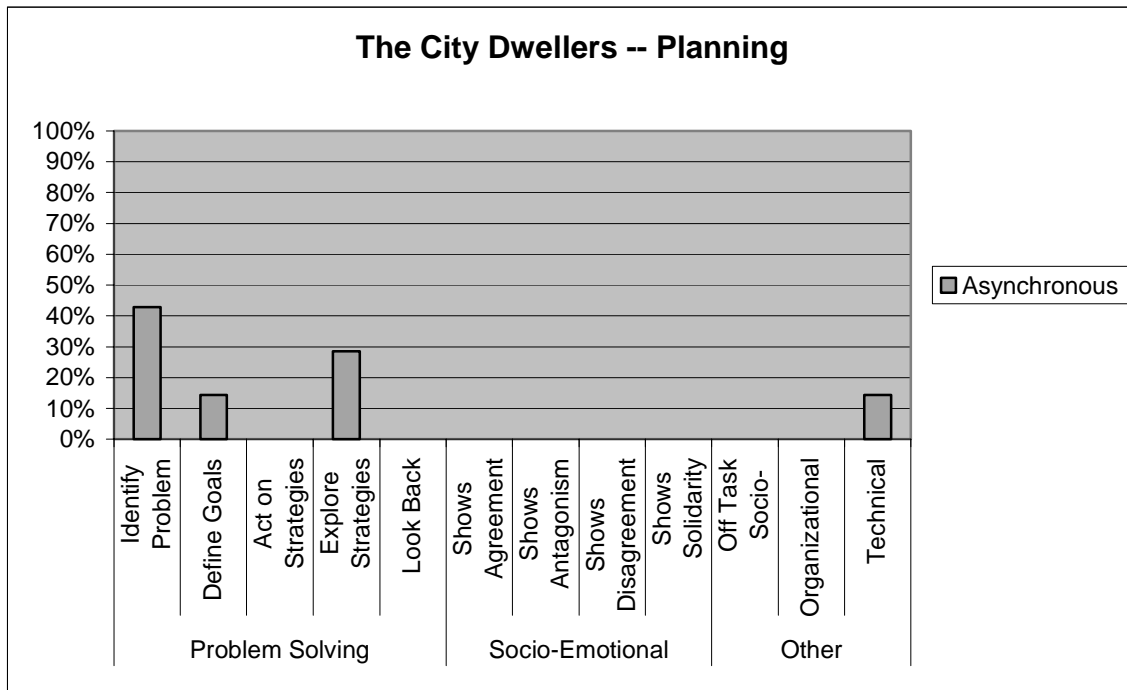


Figure 23. The City Dwellers – Planning.

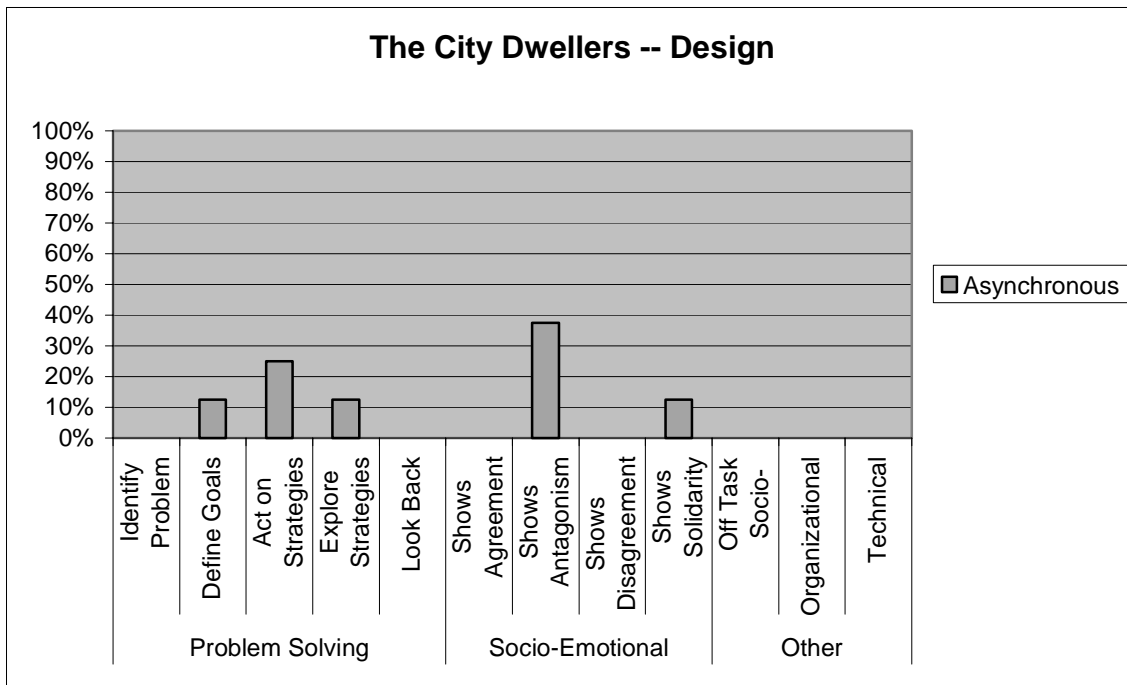


Figure 24. The City Dwellers – Design.

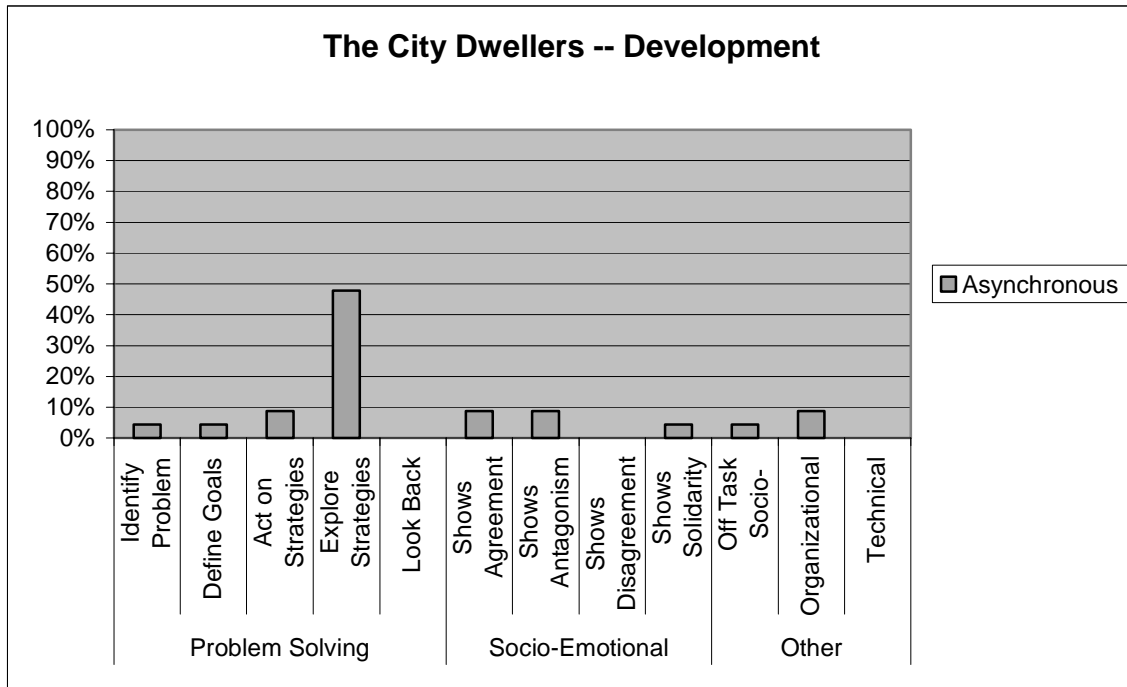


Figure 25. The City Dwellers – Development.

Evolving Interactions within the Asynchronous System

A cross-case analysis of the online interactions of all six groups provided insights into how interactions evolved over the three stages of the project (planning, design, and development). Asynchronous was looked at because only three groups used the synchronous system, but all groups used the former. When looking at the total interactions of all groups within asynchronous systems there was evidence to suggest that the process of completing the required tasks for the project followed the standard stages of problem solving. The project modules, organized by the instructor, required planning activities, followed by design activities, and culminating in development of the website. During the planning stage most interactions were related to the identification of the problem, the definition of goals necessary to address this problem, and the exploration of strategies needed to achieve these goals (See Table 2). Of the 37 total interactions relating to the identification of problem solving 73% occurred during the planning stage.

Throughout the project, there were 34 interactions that were of the definition of goals type with a little over one-half of these (56%) occurring during the planning stage. In addition to the above interactions the analysis revealed that 31% of the 70 messages related to the exploration of strategies and 15% of 100 messages related to actions taken on those strategies during the planning stage. These results show that early in the process the majority of interactions within the online environment were related to the establishment of goals and objectives necessary for completing project tasks. The presence of the latter two interactions indicates that there was also some anticipation of potential strategies that might be applied to the problem solving.

During the design stage, interactions of the identification of the problem type showed a dramatic decrease (73% to 5%). The definition of goals decreased somewhat to 38% of the total for these types of interactions across the three stages of the project. The incidences of interactions related to the exploration of strategies and acting on these strategies were similar across the design and the planning phase (31% and 27% and 15% and 16%, respectively). During the final stage of the project, when the development of the website was the primary focus, there was a shift to interactions that involved the exploration of strategies and the actions necessary to carry these out. These types of interactions dominated the dialog within the online discussions during this final stage (41% of 70 and 69% of 100). These results revealed that the nature of the tasks during the design and development stages required that participants interact in the online environment in ways that supported the implementation of the strategies necessary for completing the project. Overall, the interaction analysis indicated that the steps and sequence of the model of problem solving used for this study were present in the online communications within the groups.

Socio-emotional interactions were present in 18% of the total interactions (412) within the online dialog across all stages of the project. This was much lower than that of problem solving

which comprised 58% of the interactions. The total proportion of socio-emotional interactions was highest during the development stage of the project: planning – 32%, design – 23%, and development – 45%. This may indicate that the groups had established a rapport with each other and were more willing to post messages of this type. Within this category's subtypes (agreement, antagonism, disagreement, and solidarity) certain trends were observed. Agreement interactions were most prominent during the planning and development stages (53% and 37% of 19). It is likely that participants were attempting to seek approval of the other group members and were trying to establish amiable relationships within their group through acceptance, understanding, concurrence and compliance. There was a high occurrence of antagonistic interactions during the development stage (56% of 14). Many of these statements were apologetic in nature, referring to an inability to complete a task in a timely manner. Only 1% of the total interactions reflected disagreement. Despite some clashes within some groups, very few interactions reflected passive rejection, formality, or the withholding of help. Statements that showed solidarity were consistent across all stages of the project (26%, 39%, 35%). For the most part, participants in this study posted messages across the project that supported other group members, were quick to praise others for tasks well performed, were empathetic to the dilemmas of individuals, showed appreciation for the work of others, and demonstrated a commitment to their group. Although the overall socio-emotional interactions were low in number, there were indications that they did play an important role in the effectiveness of building and promoting amiable relationships within the top four performing groups.

The proportion of interactions that fell within the category of other was similar to that of socio-emotional with 23% of all interactions observed. There were distinctions that could be drawn

Table 15

Frequency of Interactions Across Categories and Stages

	Asynchronous							Synchronous						
	Planning		Design		Develop- ment		Total	Planning		Design		Develop- ment		Total
Problem Solving														
Identify Problem	27	73% ^b	4	11%	6	16%	37	0	0%	16	47%	18	53%	34
	20% ^a		5%		3%		9%	0%		3%		7%		5%
Define Goals	19	56%	13	38%	2	6%	34	0	0%	42	84%	8	16%	50
	14%		15%		1%		8%	0%		9%		3%		7%
Explore Strategies	22	31%	19	27%	29	41%	70	0	0%	134	96%	5	4%	139
	17%		22%		15%		17%	0%		28%		2%		19%
Act on Strategies	15	15%	16	16%	69	69%	100	0	0%	63	64%	36	36%	99
	11%		19%		36%		24%	0%		13%		15%		13%
Total Problem Solving	83	34%	52	22%	106	44%	241	0	0%	255	79%	67	21%	322
	62%		60%		55%		58%	0%		53%		27%		43%
Socio-Emotional														
Shows Agreement	10	53%	2	11%	7	37%	19	0	0%	68	89%	8	11%	76
	8%		2%		4%		5%	0%		14%		3%		10%
Shows Antagonism	7	28%	4	16%	14	56%	25	0	0%	12	43%	16	57%	28
	5%		5%		7%		6%	0%		3%		6%		4%
Shows Disagreement	0	0%	2	33%	4	67%	6	0	0%	4	36%	7	64%	11
	0%		2%		2%		1%	0%		1%		3%		1%
Shows Solidarity	6	26%	9	39%	8	35%	23	1	3%	25	64%	13	33%	39
	5%		10%		4%		6%	5%		5%		5%		5%
Total Socio-Emotional	23	32%	17	23%	33	45%	73	1	1%	109	71%	44	29%	154
	17%		20%		17%		18%	5%		23%		18%		21%
Other														
Off Task Socio-Emotional	5	24%	2	10%	14	67%	21	20	10%	74	38%	101	52%	195
	4%		2%		7%		5%	95%		15%		41%		26%
Organizational	11	19%	13	22%	35	59%	59	0	0%	17	38%	28	62%	45
	8%		15%		18%		14%	0%		4%		11%		6%
Technical	7	50%	2	14%	5	36%	14	0	0%	8	80%	2	20%	10
	5%		2%		3%		3%	0%		2%		1%		1%
Total Other	23	24%	17	18%	54	57%	94	20	8%	99	40%	131	52%	250
	17%		20%		28%		23%	95%		21%		53%		34%
Grand Total	133	32%	86	21%	193	47%	412	21	3%	478	64%	247	33%	746

Note:

a-Percentage of interactions by category type within each stage of the project

b – Percentage of interactions by category type across the three stages of the project.

across the stages of the project. During the planning stage of the project 24% of all off-task interactions (21), 19% of all organizational interactions (59) and 50% of all related to technical issues (14) occurred. The technical interactions were primarily due to problems students were

having with the communications systems within the Blackboard environment. It was somewhat surprising that there were not more organizational interactions during the planning stage. This may be due to the fact that the nature of the asynchronous system may not adequately support these types of tasks. During the design stage the proportion of organizational interactions slightly increased, and dramatically increased at the development stage. The other two types decreased (See Table 15). Fewer technical interactions indicated that the problems with the systems may have been overcome and resolved. The highest proportion of off-task (67%) and organizational interactions (59%) occurred during the development stage of the project and there was an increase in the proportions of interactions related to technical issues from the design stage (14% to 36%). Most of the interactions of a technical nature were not related to the asynchronous system, but referred to using the software necessary for constructing the website. Some of the off-task interactions during the final stage of the project indicated that participants were utilizing the online forum for personal communications. The increase in organizational interactions during the development stage may indicate that the students had learned to effectively use the system to facilitate online and face-to-face tasks necessary for completing the website.

Evolving Interactions within the Synchronous System

Three groups voluntarily chose to utilize the synchronous system, which was not a requirement for the project as was the use of the asynchronous system. These groups were of the mid to high range as far as project performance. The analysis of the dialog within the synchronous system revealed that, overall, there were a greater proportion of socio-emotional and other interactions occurring (See Table 15). The number of interactions of the problem solving type in the synchronous system was 43% out of a total of 746 statements posted. The socio-emotional and

other types garnered 21% and 34% respectively. The highest frequency of interactions over all types was the off-task socio-emotional at 26% of all statements.

As the data shows in Table 15, there were no synchronous sessions in the planning stage of the project that were of the problem solving type or socio-emotional category. One group interacted within the synchronous system during the planning stage using it for organizational purposes; in particular they used it to plan future online and face-to-face meetings. There is no clear explanation as to why the synchronous system was not used early, other than that this was not a requirement of the project guidelines as was the use of the asynchronous system. The participants may not have realized that this system might be beneficial in accomplishing tasks at the planning stage.

During the design stage of the project the majority of statements offered in the synchronous system were of the problem solving type (53% of 478 messages posted). This might indicate that these systems were used as an extension of the asynchronous system in completing necessary problem solving tasks. When looking across the types within the problem solving category the exploration of strategies comprised 96% of 139 statements of this type and the act on strategies type was 64 % of 99 statements. These high levels show that strategic implementation was occurring frequently during the design stage within the synchronous system. There were high levels of statements within the socio-emotional type that were of the shows agreement type (89%) and the solidarity type (64%) when comparing these across types. Fewer antagonistic and disagreement statements was probably due to the fact that the participants were still getting acquainted and were trying to build positive relationships within their groups. This is also supported by the fact that the majority of the interaction types within the other category were off-

task socio-emotional statements (15% of all interactions within the design stage) indicating that interactions were not restricted to those related to the project.

The students exhibited most of identification of the problem interactions during the development stage (53%). This is interesting in that this was late in the project when problem identification should have already been established. One explanation for this may be that the groups were using the synchronous system to revisit what it was they were trying to accomplish. During the development stage of the project, messages of the acting on strategies type were more prevalent than the other types within the category of problem solving (15% of all statements compared to 12% combined for the other three) which shows that the synchronous system was used to complete strategies relevant to project tasks. Within the category other, there were higher rates of interactions of the off-task and organizational types in the development stage (52% and 62%). Most organizational statements referred to what individual tasks each group member needed to complete. The off-task statements, for the most part, referred to activities occurring outside of realm of the project such as sporting events and were at times somewhat personal in nature.

Although a formal comparison of the differences between asynchronous and synchronous was not conducted, there were some indications that they do exist. It appears that there were higher rates of off-task interactions within the synchronous systems. It is likely that the immediacy of this system resulted in more casual interactions. It was also interesting that there were more agreement statements within the synchronous system during the design stage. This may again be related to the immediacy of the system. Further analysis is currently underway to clarify these distinctions.

Differences between High and Low Performing Groups

When comparing two high and two low performing groups noted differences were found. Extreme case and criterion sampling were used to select two groups for further analysis (Patton,

1990). The interactions of these groups, that utilized only the asynchronous system, revealed these differences (The Generals – high achieving score of 97 and The City Dwellers – low achieving: score of 64: See Table 8). There were differences between the high and low performing groups in how their dialog reflected the problem solving steps, the extent of their socio-emotional connections, and their attention to organizational details.

When comparing the groups it was observed that the low achieving group had a low frequency of interactions throughout the project and the messages exchanged were inconsistently distributed across all stages of the project. Several days would often elapse before a member of the low achieving groups would post a message to the discussion board. In contrast the high achieving group posted frequently in most cases at least one message was posted and responded to everyday. The high group identified their problem during the planning stage whereas the lower group started identifying the problem during the planning phase and were still doing so during the developmental stage. There are noticeable differences in the two groups in how they explored and acted on strategies, as well. The low group was late in the exhibiting these types of interactions, posting messages of this type in the design stage and most were posted in the development stage. These late postings were of the exploration of strategies type and compromised 11 out of the 25 messages in this category (See Table 16). The high group showed a consistent pattern in the interactions pertinent to the exploration of strategies across the three phases of the project. The high group showed high rates of acting on strategies during the development stage, where as the low group had low rates of interactions in this category in both the design and development stages (2 and 2 respectively). These patterns of interaction may explain why one group outperformed the other in that the high achieving group was more actively engaged in the problem solving process

throughout the project timeline and followed the steps that determine effective strategies for completing tasks within the appropriate stages of the project within the online environment.

Table 16

Comparative Interactions for a High and Low Performing Group

	The Generals (Project Score = 97/108)							The City Dwellers (Project Score = 64/108)						
	Planning		Design		Development		Total	Planning		Design		Development		Total
Problem Solving														
Identify Problem	9	100% ^b	0	0%	0	0%	9	3	75%	0	0%	1	25%	4
	29% ^a		0%		0%		11%	43%		0%		4%		11%
Define Goals	3	50%	3	50%	0	0%	6	1	33%	1	33%	1	33%	3
	10%		21%		0%		7%	14%		13%		4%		8%
Explore Strategies	5	33%	4	27%	6	40%	15	2	14%	1	7%	11	79%	14
	16%		29%		16%		18%	29%		13%		48%		37%
Act on Strategies	2	8%	4	16%	19	76%	25	0	0%	2	50%	2	50%	4
	6%		29%		50%		30%	0%		25%		9%		11%
Total Problem Solving	19	35%	11	20%	25	45%	55	6	24%	4	16%	15	60%	25
	61%		79%		66%		66%	86%		50%		65%		66%
Socio-Emotional														
Shows Agreement	2	67%	0	0%	1	33%	3	0	0%	0	0%	2	100%	2
	6%		0%		3%		4%	0%		0%		9%		5%
Shows Antagonism	4	57%	0	0%	3	43%	7	0	0%	3	60%	2	40%	5
	13%		0%		8%		8%	0%		38%		9%		13%
Shows Disagreement	0	0%	1	100%	0	0%	1	0	----	0	----	0	----	0
	0%		7%		0%		1%	0%		0%		0%		0%
Shows Solidarity	1	100%	0	0%	0	0%	1	0	0%	1	50%	1	50%	2
	3%		0%		0%		1%	0%		13%		4%		5%
Total Socio-Emotional	7	58%	1	8%	4	33%	12	0	0%	4	44%	5	56%	9
	23%		7%		11%		14%	0%		50%		22%		24%
Other														
Off Task Socio-Emotional	1	100%	0	0%	0	0%	1	0	0%	0	0%	1	100%	1
	3%		0%		0%		1%	0%		0%		4%		3%
Organizational	4	27%	2	13%	9	60%	15	0	0%	0	0%	2	100%	2
	13%		14%		24%		18%	0%		0%		9%		5%
Technical	0	----	0	----	0	----	0	1	100%	0	0%	0	0%	1
	0%		0%		0%		0%	14%		0%		0%		3%
Total Other	5	31%	2	13%	9	56%	16	1	25%	0	0%	3	75%	4
	16%		14%		24%		19%	14%		0%		13%		11%
Grand Total	31	37%	14	17%	38	46%	83	7	18%	8	21%	23	61%	38

Note:

a – Percentage of interactions by category type within each stage of the project

b – Percentage of interactions by category type across the three stages of the project.

There were few indications of socio-emotional interactions in the low group and high group. One observation was that there were no messages posted during the planning stage under this category for the lower performing group. The high group posted about the same number of socio-emotional statements (9 – low and 12 – high) as the lower group, however their postings were dispersed across all stages of the project. This suggests that performance may be affected by the presence of these types of interactions throughout the project.

Table 17

Summary of Differences between High and Low Performing Groups

High	Low
High frequencies of interactions posting messages almost daily	Low frequencies of interactions posting messages intermittently with several days between each
Identification of problems occurs during the planning stage of the project	Most identification of problems occurs during the planning stage, however is still present during the development phase
Exploration of strategies begins in the planning phase	Exploration of strategies begins in the design phase
Acting on strategies evidenced across all stages, but primarily in the development stage	Acting on strategies evenly distributed during the design and development stages; no evidence during the planning phase
Socio-emotional interactions present throughout the project	No socio-emotional interactions in the planning stage
Organizational interactions are present throughout the project	No organizational interactions until the development stage
Thought provoking questions posed and exchange of ideas flow freely	More directive statements rather than questions and exchange of ideas restricted
More in depth discussions	More surface level discussions

Within the other category, the high group showed evidence of interactions consistently across all stages in organizational types of statements. The low group did not post any

organizational messages until the development stage and then they only posted two of this type. This indicates that the higher performing group utilized the online system to facilitate online discussion and to manage tasks necessary for project completion more effectively than the lower performing group.

Additional analysis of the content of the messages revealed differences between the two groups with respect to the quality of the interactions that occurred. The high performing groups posted thought provoking questions and there was evidence of a free flowing exchange of ideas. To the contrary the low performing groups posted statements that were more directive, with very few questions posed and a very restrictive exchange of ideas. The high groups had discussions that were more in depth, whereas the low group's discussion was more inclined to be surface level in nature. See Table 17 for a summary of these findings.

Contributions and Temperament Type

Of the sixteen temperament types suggested by Keirsey, seven were represented among the students participating in the study: Artisan Performer (n = 1), Artisan Promoter (n = 1), Guardian Protector (n=3), Guardian Provider (n = 5), Guardian Supervisor (n = 8), Idealist Champion (n = 2), and Idealist Teacher (n = 1). Five relationships surfaced in the analysis of the data that indicates a possible relationship between temperament and how group members contribute to the completion of tasks in the CMC systems. See Table 18 for a matrix of the results of this analysis.

The Idealist Teacher contributed consistently and frequently, providing support with problem solving, socio-emotional, and organization tasks. According to Keirsey (1998), The Idealist Teacher temperament type represents those who are cooperative, lead surreptitiously, handle other well, are able to handle situations on the fly, and are usually popular among those around them.

The Guardian Protectors provided socio-emotional support to their group members which can be seen by the high number of interactions in the socio-emotional categories. Guardian Protectors are usually hard working individuals that take their work seriously. They tend to be thorough and will often take on tasks that others avoid or ignore.

The Artisan Promoter, Guardian Supervisors, and Idealist Teacher all contributed suggestions for problem solving and exploring potential strategies in the design phase. Guardian

Table 18

Keirsey Temperament Results

	Identify Problem		Define Goals		Explore Strategies		Act on Strategies		Shows Agreement		Shows Disagreement		Shows Solidarity		Shows Antagonism		Off Task Socio-Emotional		Organizational		Technical	
KTS-II	Asynchronous	Synchronous	Asynchronous	Synchronous	Asynchronous	Synchronous	Asynchronous	Synchronous	Asynchronous	Synchronous	Asynchronous	Synchronous	Asynchronous	Synchronous	Asynchronous	Synchronous	Asynchronous	Synchronous	Asynchronous	Synchronous	Asynchronous	Synchronous
Artisan Performer (n=1)																						
Planning	L				M				M						M				M			
Design																						
Development					L										M		M		L			
Artisan Promoter (n=1)																						
Planning	L		M		L		L														M	
Design			M	L	H	M	L	L		M			H	M		H		H	L	H		
Development											H							L				
Guardian Protector (n=3)																						
Planning	H		L		L		L						L	L	L		L	M	L		L	
Design	L	L	L	M	M	L	L	M	L	L		H	L		L	L		M	L	M	L	H
Development	L		L		M		M		L				L		M			M				
Guardian Provider (n=5)																						
Planning	L		L		M		L		L				L		M		L	L	M		L	
Design		H		M	L	L	L	M	L	L		M		M	L			M	L	M	L	H

Supervisors are usually rules and procedure driven, not easily held back by others, and shun speculation and experimentation. The Artisan Promoter are persons of action that seem to make things happen and who have an ability to work with people like others work the tools of their trade.

There were some indications that the Guardian Protector and the Idealist Champion demonstrated the most active involvement in the development phase by acting on and producing strategies. Idealist Champions like to be actively involved in what is going on around them and as indicated earlier Guardian Protectors exhibit thoroughness and take pride in task completion.

Clearly, individuals with various different temperament types contribute in different ways and at different phases of project development. This demonstrates the importance of forming heterogeneous groups which include members with different strengths and personality characteristics.

Student Perceptions

The primary question addressed here was, “What are student perceptions and attitudes towards participation in the completion of a project in a learning environment that utilizes CMC systems as a tool for collaboration?” The underlying questions to explore this were:

- What preferences did the groups have for the different types of CMC systems?
- What differences existed in the perception of students about leadership and task distribution between groups with high and low quality projects?
- What were the perceptions and attitudes of students concerning the collaborative project what suggestions did they offer to improve the experience?

The survey data were analyzed using a constant comparative method to identify themes in the responses.

The consensus of all participants was that they preferred face-to-face meetings, using the asynchronous and synchronous systems in support of their offline activities and meetings. In general, they preferred using asynchronous CMC although those that used the synchronous system thought that it had some utility as well.

Among the benefits identified for the asynchronous system was its anytime, anywhere aspect. Students liked the discussion board in that messages could be posted and made available for the comments of others to be made at a time that was convenient for them. However, this aspect seen as positive by some was viewed as a negative by others in that asynchronous communication created problems because delay time often occurred when other students did not check the board often enough. Several participants noted that they liked the fact that this system was a good place to pull together the contributions of individual group members. Several students noted that while their group found asynchronous communication very useful in the planning and design stages of the project, they found it somewhat cumbersome during the development stage. There were several comments that indicated that students found asynchronous CMC was better suited for organizational tasks and for presenting “ideas for thought” for which the group needed some time to consider. Overall, most groups felt that the asynchronous system was the most useful in the completion of project tasks.

Of the students that used the synchronous system most responses were positive and they found several advantages over the asynchronous CMC for certain kinds of tasks. They preferred using synchronous CMC for brainstorming and later using the asynchronous system to follow up what was discussed there. They thought that this system was better suited for the free flow of ideas. Most liked the near face-to-face feel of chatting. Several commented that this system was more efficient when fast decisions needed to be made. Those that used both felt that each had its place,

depending on the task to be completed. Several individuals who were in groups that did not use the synchronous system at all or used it later in the semester for another class assignment felt that this system might have benefited their groups in completing tasks, particularly tasks that are not deemed as being efficiently accomplished using the asynchronous system.

In high performing groups there was a perceived leader, however this person often shared the leadership role with other group members. Their primary leadership role was to organize tasks and delegate responsibilities. Many tasks involved shared leadership such as getting everyone on the “same page”, planning fact-to-face meetings, and moderating online communications. Leaders played the role of facilitator, not dictating what everyone needed to do. Leadership roles were enhanced by the CMC in that they found it to be an effective way of “tying up loose ends” and bringing things together for online submission of required components.

In the effective groups tasks were perceived to be fairly distributed with some members taking on smaller more frequent tasks and others performing more difficult tasks that were more time consuming. These groups felt that the CMC systems that they used were effective in managing group tasks and in getting tasks accomplished. They felt that as they progressed through the process of designing a website that they became more proficient at utilizing online communications. One participant noted that as the project progressed they became more proficient at knowing when group members would post messages to the discussion area. They began, “to get a feel for when others posted messages” making the exchange of information more efficient. The members of the high performing group found that they were not managing their time effectively, particularly online, early in the project and made adjustments to correct this.

The low performing groups had relatively no leadership. One group had a self-perceived leader who claimed to assign tasks to other group members and would “suggest meeting times to

work on the project and tell each person what they needed to have completed for the next meeting.” Other group members saw this individual not as a leader but as more of a dictator. The other group had a dominant leader who assumed responsibilities for many of the project tasks. This leader utilized the asynchronous system to set up face-to-face meetings and to coordinate activities in the discussion board. He also was the group member to seek out help from the instructors when he or the other members had technical difficulties. The other members in this group recognized the contributions that their leader made to the project, but for the most part thought that tasks were fairly distributed. The leader did not perceive this to be true and felt that his burden of responsibility for getting tasks completed was unfairly placed on his shoulders. In general, there was a sense that each member did more than others and that other group members were not sufficiently dedicated to the project. One person felt that one of their primary responsibilities was to play negotiator to other bickering group members. Other complaints were that members were slow to respond to online messages, requiring someone else to assume responsibilities, causing duplication of tasks, and wasting time.

Although a few students indicated that they preferred working independently, most students enjoyed the experience, found the project challenging, and felt that working with others was beneficial to their learning. For most this was a first time experience in collaborative learning of this type. Several were very proud of their final product and felt a “sense of accomplishment. They felt that the collaborative experience was “fun” and it gave them an opportunity to meet new people and to establish new friendships.

The primary concern of most students was the time constraints that were imposed on the project. Many felt that if they had more time to complete the project then they might have done a better job. There were some concerns that there was too much emphasis placed on the online

communications, feeling that better time would be served in face-to-face meetings. One student did not like that fact that the instructors monitored their online interaction. When asked what they found out satisfying and less satisfying about the project they responded as follows:

Finishing it!!!! I wasn't excited when we were assigned groups for this project and I had no idea where to begin on creating a website. I personally hate group projects because I'm so independent and like to get stuff done myself. Group projects force me to slow down and trust other people. What was satisfying was working together for a common goal and seeing it finally accomplished when we thought it would never happen. I helped create a website and that's something I never thought I would be able to do!

Most students perceived the collaborative learning project as being a positive experience and expressed that it was a beneficial and fulfilling process.

CHAPTER 5 DISCUSSION

The purpose of this study was twofold. The first was to investigate how students functioned in a Web-based, collaborative learning environment in the postsecondary classroom for which project-based learning is the method of instruction. It is important to understand how tasks are negotiated, carried out, and completed in both synchronous and asynchronous systems. Online interactions were documented to provide information about the strategies used by students to complete project tasks. The second purpose of this study was to gain insights into student perceptions and attitudes towards the process of organizing, carrying out, and completing a project-based, collaborative learning activity in an online environment. This chapter will present conclusions based on the results of this study, implications for practice, and recommendations for future researchers.

Conclusions

The content analysis of student dialog in both asynchronous and synchronous systems revealed that there were patterns in how students solved the problem of developing an informational website. Clear evidence emerged showing that the dialog followed the problem solving model including identification of the problem, establishing goals to arrive at a solution to the problem, the exploration of strategies that might help accomplish these goals, and the actions taken to implement these strategies. There was some evidence of students looking back to analyze what they had accomplished, but there was not enough data collected to make any conclusive interpretations of this phase of problem solving. The first four steps of the IDEAL problem solving model occurred during the three stages of the collaborative project when students

interacted using computer-mediated communications. These findings support calls for the implementation of online communications systems that supports active problem-based learning and that facilitates collaboration among college students (Anderson, 1997; Debard & Guidera, 1999-2000). The results of this study showed that online collaboration is possible and can be effective if students are actively involved in the dialog that occurs within the communications systems. These findings have been supported by other recent research on collaborative learning in online environments (Curtis & Lawson, 2001). The implementation of online learning is not merely transferring course materials such as lecture and notes into electronic formats that can be posted to a web page for students to peruse online (Bonk, 1996; Schank, 1998), but should afford opportunities for the deep learning that most educators want students to garner in their educational experience. Computer supported collaborative learning provides opportunities for this deep learning to occur (Armitt, Slack, Green, and Beer, 2002).

Another significant contribution of this research is that off-task and organizational statements may in some way manifest themselves effectively in synchronous systems because of the spontaneous nature of the system. The results of this study indicate that learners may be more comfortable with each other in “live” modes of communications and that group building and social negotiation are enhanced when virtual communications is mediated in this manner. Synchronous systems may do more to support socio-emotional and group organization in collaborative efforts than asynchronous systems because they are more personable and interactive. These systems have the potential to become vehicles for the implementation of social constructivist pedagogies (Savery & Duffy, 1995). An understanding of the how the social construction of knowledge manifests itself in online collaboration and in how instructors might facilitate this is a growing concern of many researchers and practitioners (Lally & de Laat, 2002). This study also indicates that that there are

potential distractions and interfering variables that may be present with synchronous systems that may disrupt or hinder student task completion and therefore distract from the learning process. Students tend to post messages within these systems that are not relevant to the project, leading to off-task interactions that do not support the task at hand.

The patterns, types, and frequencies of interactions that occur within CMC systems between members is directly related to how well groups perform in collaborative, project-based learning environments. The initial stages of a project are important in how a group performs and their online interactions reflect how effectively they begin the process of solving the problem-solving tasks at hand. The findings of this study suggest that the participation rates of each group member is important in how well the entire group performs on a project-based learning activity. The socio-emotional interactions that occur online also may reveal how groups are developing the camaraderie and bonds that are necessary for effective collaboration. It is important that they interact effectively in their interpersonal relationships, in their group building and management processes, as they inquire and exchange ideas, and during the resolution of conflicts (Bosworth, 1994). This study suggests that the skills that are important for effective collaboration in traditional settings are just as important and perhaps even more so in online environments.

This study provides insights into the characteristics that high performing groups exhibit in how they share leadership responsibilities, distribute tasks according to their individual talents, and are able to define and understand task responsibilities in an online environment. Groups that perform well have established leaders and in most incidences share these roles at different stages of the project. These leadership roles can be observed within the dialog that occurs in both asynchronous and synchronous systems. Another observable phenomena within online communications systems is that lower performing groups are ineffective in developing leadership

roles. These may be dictatorial or may involve a leader who takes on most of the responsibilities of the project themselves. The emergence of leadership roles in online collaborative learning environments is relevant and it has been suggested that relationships exist in how these roles evolve differently across communications systems (Yamaguchi & Olson, 2002).

Personality traits are an important factor in how groups interact and perform (Hare, 1992) and this may be especially true of online learning environments, where there are fewer physical cues than in face-to-face situations. There are traits that may not be apparent in on-line interactions that may determine how a statement is interpreted. The primary focus of this research was not on student characteristics as a factor in the interactions that occur in group dialog and in how they affect the performance of groups. However, preliminary indications reflect that student characteristics are a barometer for how group members initiate and carry out specific types of tasks using both asynchronous and synchronous systems and that students with different temperament types play different roles in the online environment.

Both asynchronous and synchronous systems have a place in project-based learning, but are perceived by the learner to be more or less effective depending on the task. The results of this study indicate that synchronous systems are viewed as more personable, better suited for brainstorming, best for the free exchange of ideas, and may be more appropriate when there is immediacy attached to a task. Asynchronous systems are good vehicles for organizational tasks, for the coordination of activities, for collecting individual contributions in an efficient manner, and for posting ideas that do not need immediate clarification or that require deeper thought. Asynchronous systems are convenient and effective in developing ideas that require time for reflection and at the same time they are ineffective in that it often takes too long to get feedback from others. The results of this study contribute additional support to the notion that there are high satisfaction rates among

students involved in online learning environments (Benbunanan-Fich & Hiltz, 1999; Johnson, Aragon, Shaik, & Palma-Rivas, 2000; Thoennessen, Kashy, Tsai, & Davis, 1999), in particular in the case of when students are involved in project-based learning activities.

Project-based learning within an online learning environment is a rewarding, challenging, and at times frustrating learning experience to many students. Ample time must be afforded for completion of tasks so that students experience a sense of project closure resulting in a sense of pride in the accomplishments of the group. Members should feel that they have produced a product that, although not perfect, surpasses their expectations. Most of the participants in this study indicated that they enjoyed working with their group and that, although they did not feel they were afforded enough time for the project they did feel pride and were satisfied with their final product. Although there the participants were very pleased with the learning outcomes of the course used for this study there were pockets of resistance to online learning. This may be grounded in student perceptions that face-to-face meetings are more effective and efficient in accomplishing project tasks. There were indications that these attitudes often change as students become more adept at using these tools. Initially, the advantages of using CMC systems to support traditional types of communications may not be apparent to students because they lack the experience of using these types of tools for computer supported collaborative learning (McComb, 1993).

Implications for Practice

This study provides implications for practice to instructors, instructional designers, and administrators. These include both theoretical and foundational insights into how online learning should be conceived and implemented for effective learning to occur when using new communications technologies. Most agree that it is necessary that the pedagogical foundations of higher education must change so that students are actively involved in the creation on their own

knowledge and the all-knowing professor dispensing knowledge to his eager subjects is a thing of the past. Instructors must be aware of the benefits and pitfalls of online learning and must be able to apply their expertise (or develop that expertise) of the face-to-face pedagogies with which they are familiar and have found effective in traditional learning environments to online learning environments (Campos, Laferrière, & Harasim 2001). Adaptation of existing materials may require sufficient modifications in order that they might promote collaborative environments that effectively enhance learning. This study gives an example of a portion of an effectively designed course that integrates this philosophy into practice. Although not perfect it provides a basic foundation for future implementation of project-based learning supported by online technologies.

This study also suggests possible methods that can be further developed and adapted for everyday use by instructors that aid in the evaluation of online activities by establishing models for the analysis of the interactions that occur in the online communication among learners. The evaluation of online participation and the processes that occur on-line is difficult and time consuming. There have been numerous attempts to establish models that are applicable to collaborative learning environments (Gunawardena, Anderson, and Lowe, 1996; Henri, 1991; Lee, Liang, and Chan, 1995). They offer interesting categories that are not easily interpretable to those outside the field of computer supported learning environments. One outcome of this study maybe a model that is more adaptable to everyday use.

Student perceptions of the process of using online communications to complete a learning project indicates that there are preferences for the types of systems used and this depends on the type of task, the expediency necessary for completing the task, and the characteristics of individual group members. Practitioners who wish to use online communications as a part of their teaching strategies should consider these factors when designing instructional units.

This study also raises an awareness of the potential problems that may impede successful completion of assignments when utilizing online communication. Instructors may need to intervene and facilitate group involvement if it becomes apparent that a group is not actively involved early in an activity. It is also important that instructors be aware of effective ways to facilitate and involve themselves in the online interactions of their students in ways that promote learning and collaboration (Anderson, Rourke, Garrison, & Archer, 2001; Wu, Farrell, & Singley, 2002). Computer supported collaborative learning systems should be developed so that they provide instructors with tools that facilitate effective and efficient involvement in the interactions of online learners (Hemlo-Silver, 2002).

To the instructional designer this study establishes insights into the processes of interaction that occur within the online dialog of students working collaboratively to complete a task. It has implications for designing pedagogies for online learning environments that account for the social interactions that are important for effective collaborative learning. To both instructors and instructional designers, this study provides an understanding that different types of systems may be better suited for specific learning goals and objectives (Parker & Gemino, 2001).

To administrators and policy makers this study provides insights into the intricate planning that is necessary for effective online learning. Guidelines for developing strategies for implementing online learning are necessary and an awareness of the difficulties that instructors are faced when integrating online learning into the curriculum must be established within university administrations. It is important that faculty members are afforded opportunities for professional development that address issues that are fundamental to the development and implementation of pedagogies that promote effective online learning.

Recommendations for Future Research

Future research should include empirical studies that focus on the effectiveness of specific CMC systems and their features in the context of specific learning goals and objectives. Comparisons should be made between the type of system (asynchronous vs. synchronous), student performance within these systems, and the usage patterns that are apparent within these systems. Qualitative studies are necessary that explore how students with varying learner characteristics function in various CMC systems in order to gain a richer understanding of the cognitive and affective factors that influence learning in an online environment. The processes that take place in collaborative learning are complex and a medium must be established that provides a vehicle for capturing and analyzing the discourse that occurs in the process of online collaboration. Further refinement of interaction analysis models that fit specific learning environments is needed. It has been suggested that the current methods of analyzing the online collaborative learning through discourse analysis and interaction analysis needs to be rethought and alternative methodologies of analyzing the interactions that occur in online collaborative problem-solving environments is necessary (Avouris, Dimitracopoulou, Komis, & Fidas, 2002).

By observing students' online interactions it is hoped that a better understanding of the strategies used to complete tasks and the collaborative skills necessary to be effective participants in online group work will be gained. As courses are offered via distance technologies, it is important to implement effective collaborative learning activities via online systems. The research contained here contributes to the existing literature on the use of online computer systems for implementing instructional activities in university courses. It provides insights to the importance of and the differences in how students utilize synchronous and asynchronous systems and to the strategies needed by students to engage in project-based learning successfully.

This study explored the processes of collaboration in an online environment in ways different from previous research. Valuable insights into the interactions that occur online as students participate in project-based learning were revealed that have to this point only been given a superfluous treatment in the literature. The complexities inherent in the processes that occur in on-line collaboration have been demonstrated and it is hoped that new approaches to studying these phenomena will emerge from the design and outcomes of this study.

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APPENDIX A
DESCRIPTION OF THE PROJECT

Instructional Media Project

Purpose and Scope of the Project

The purpose of this project is for you to demonstrate your ability to apply the concepts covered in class to the design and development of a website providing information to a targeted audience. This project will reflect real world problems and applications that will give you experience that will help you in your future in the work place. You will be assigned to collaborative teams and will be provided with the background information and with the requirements that must be met for completion of the project. This project will be designed using Microsoft FrontPage, Microsoft Office, and HTML the standard language for creating web pages. You or your group may want to consider purchasing or checking out reference books that will give you more details about these programs above and beyond what will be presented in class. A list of suggested books will be provided. There are also many resources on the Internet that may help you with these programs. Each component listed below should be organized and submitted in the appropriate form on the designated due dates. This project will account for 100 points (one third) of your course grade. Points will be assigned as a group so it is vital that you work as a team. Grades will be given according to the quality of the submitted work and on meeting requirements for each component. The instructor will use rubrics to assign grades. Group membership will be determined by the instructor. The project will require you to work together outside of class using electronic communications. **You should discuss your project only within the confines of your group.**

Required Components of the Project

Online Communication (25 points; checked weekly on Tuesday by the instructor)

Electronic communication has become an important element in working collaboratively with your peers in both educational and real world environments. To help you in your collaborative effort for this project, a designated web space will be provided so that you may communicate outside of class reducing the need for face-to-face meetings. Groups will be required to utilize these components at least twice a week using both a discussion group and a virtual chat room. Limited class time will be available to your group to work on your project. Your participation in online discussions and chat sessions will be a major part of your project grade. Participation will be monitored and tracked throughout the process.

Online Collaboration: You will be required to collaborate utilizing the online communications provided for your group. Little class time will be available for your planning because we must devote a large amount of time showing you how to use FrontPage and basic HTML. **You should only use the Discussion Group to communicate on project matters.**

Planning the Website (25 points; due October 26 at 12 PM)

Creating a web page requires careful thought and planning before the actual design begins. Your group will need to discuss and plan your project by preparing a 2-3 page written report that will summarize issues that are important to your site. First you need to consider your objectives and list them in the report. You should give a rationale for each objective, stating its importance to the overall purpose of the website. Next you need to decide on the style (background, text format and layout) that your website will include. The objects (text, graphics, video/audio, etc.) that you plan to use on your website need to be defined. Finally you need to include a sketch of your site.

Designing the Website (30 points; due November 21 at 2 PM)

Once you have completed the planning phase you will begin designing and developing the website. Your site should include around twelve pages five of which will be a PowerPoint presentation. The website will include the following:

- I. Homepage (5 points): The page that is the main entry point for your site. Here you will need to include a brief description of your site and links to the other pages of your web environment.
- II. Web pages (10 points): This will be from 3-4 pages accessed from your home page (and/or other pages) with information relevant to your objectives. These pages should include appropriate examples of still and animated graphics, video with or without audio, and audio.
- III. PowerPoint Presentation (5 points): This will be a five-slide presentation that can be viewed on the web.
- IV. Data Collection (10 points): You will need to decide in your planning phase any information that you may want to collect from your audience. You should include a page that contains a form that will help you gather this information.

Implementing the Website (5 points; due November 30 at 2 PM)

This is the final phase of the project. Once you have designed and developed your site you will need to prepare it for transportation to a web server. You will then upload your site to the server. Once your site is available on the web server you will need to test it and make sure that all links work and make sure that your site is accessible on computers that your audience will be using. You will also need to test it using various browsers to make sure that it is compatible.

Reflective Journal (5 points; due weekly on Tuesday at 11 AM)

Students will be required to submit one reflective journal entry each week that expresses your thoughts and feelings about the collaborative project. These journal entries will be submitted via electronic communications through your instructor's email account. No one but the instructors will see these journal entries. You are encouraged to be candid and truthful in your reflections.

Project Guidelines: Specific instructions and requirements will be provided for each component as it is introduced.

APPENDIX B

PROJECT MODULES

Module 1

Planning

Exploring Websites, Determining Your Goals and Objectives, and Creating an Identity.

To be completed using your group's online discussion board. (Should be completed by October 24 at 11:00 AM).

- a) Review the Suggestions for Effective Collaboration in the Course Documents > Collaboration folder of the course Blackboard site.
- b) Find 3 appropriate URLs that your group thinks are good examples of effective websites
 - i) Find the sites (one from each group member). Make sure that your sites contain all of the design elements (e.g. Consistency, Design Elements, etc.) and media (sound, video, graphics, animations, etc.) that we have discussed so far in the course. You might want to refer to the categories suggested on your midterm exam for the design issues. These are also posted under Course Documents > Design Issues.
 - ii) Post the sites to your group Message Board under Communications > Group Pages > Your Group. (See instructions for doing this under Course Documents > Blackboard How-To's folder)
 - iii) Once your group has the three sites posted review each and discuss the effective and creative elements of the websites using your group Message Board.
 - Start new topics (Consistency, Design Elements, etc.) by creating new threads.
 - Respond to these topics by replying to these threads.
- c) Determine the goals and objectives of the website your group will create.
 - i) What will be the purpose/goal of the website?
 - ii) Who will be the target audience?
 - iii) What do you want to convey to your target audience?
 - iv) What are 5 specific objectives for the website?
 - v) What kind of information might you want to collect from you web users?
- d) Create an identity for your group by deciding on a name that best fits your group. Spend a couple of days getting to know each other online and then decide on a name (ex. The Web Masters).

Module 2a

Design of the Website

Must be completed by using your group's online discussion board or chat room within the course Blackboard site. (Due October 31st at 11:30 AM).

1. Shape the Solution.
 - How will you present the information so your audience will benefit from it?
 - What features will you incorporate to motivate your audience to be engaged with your site?
2. Determine the content.
 - What content will you need to deliver in order to accomplish your goals and objectives?
 - What will be the best combination of media to use as the delivery system?
3. Choose appropriate media and methods of delivery.
 - What do you want to convey with specific media types (text, graphics, video, etc.)?
 - What factors do you need to consider when choosing media types and the method of delivery as this relates to your users (expertise, kind of equipment used by users, etc.)?
 - Where will media types fit in within the website?
4. How do you want the website to look and feel?
 - Decide if you want to use a metaphor. If so, describe your metaphor and how it enhances your site.
 - Describe how you envision the personality of your website.
 - Describe style elements.s
 - How do you want the website to look?
 - What fonts will you use? (Need not be specific as for as the name of the font)
 - What types of colors (cool/warm) do you think will fit your site?
 - What kind of background might you want for your site (solid color, texture, image)?
 - Describe the text, graphics, animations, videos, and audio that you will include in your site. How do these support your goals and objectives.
5. What specific information will you gather with the forms page?
6. What will be the purpose of the PowerPoint presentation that you will include in your website.

Directions

Prepare a Word document that answers the above questions. Submit this document to the instructor using the File Exchange feature within your group page.

Be prepared to map out and storyboard your site next Tuesday (Oct. 31st) in class. Make sure that your group has any materials you may need to complete your storyboard (colored markers, index cards, sticky pads, etc.). How you do your storyboard is up to your group. Use your imaginations!

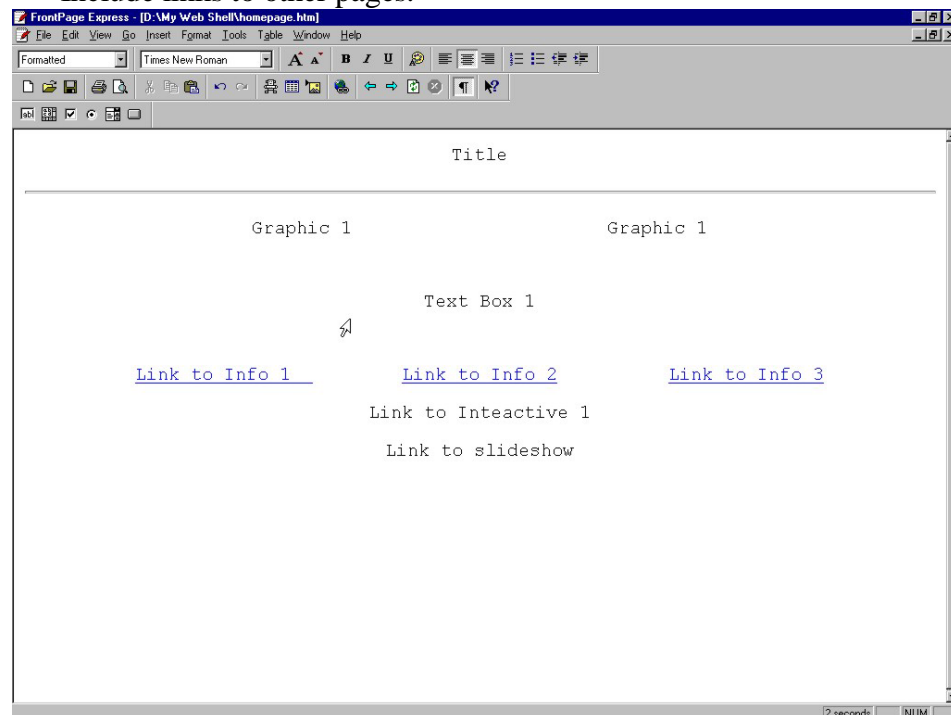


Module 2b

Web Design and Development

Portions must be completed by using your group's online discussion board or chat room within the Blackboard site. (Due November 7th at 11:30 AM).

1. Create a shell of the website using FrontPage Express. A shell is the basic framework of your website. You should use your storyboard to indicate where objects will be placed on the page.
 - To accomplish this task you will need to negotiate within your group how you are going to distribute responsibilities for creating the shell. This should be done online using either the discussion board or the chat rooms within Blackboard. You will also need to determine how you are going to exchange files from this point forward. One way to do this is to use the File Exchange feature of Blackboard.
 - Create a folder on your Zip disk that will contain all of the parts of your website.
 - Create each page (splash, home, 3 info, 2 interactive) by selecting File > New.
 - Save each page with a file name that indicates what page it is (ex. Home.htm, Info 1.htm, etc.). Do not publish the site at this time. Save it as a file.
 - Once you have created the pages you need to do the following on each page:
 - Include the title of the page
 - Indicate (in text) where objects will be placed on the page.
 - Include links to other pages.



2. Gather the required assets (objects) that you need for your website.
 - Create or collect all of the necessary objects (animation, graphic, video, audio, etc.) that you will need.
 - Create or collect all of the text that you will need.
 - Determine if you will need any programmed elements (Java scripts, CGI scripts, etc.) and locate these.
 - Create folders in you website folder to hold all of these files.
 - Save the files to you website folder.

Directions

You will turn in your shell and all of the objects to be used in the website. To do this you will need to save your website folder in compressed form using a program called WinZip (see External Links in Blackboard to go to the website and download this program if you do not have it). The file that will contain your compressed version of your website will end with the extension *.zip and will look like folder in a vise. You will submit this file to the File Exchange area of your Group Page. Only one should be submitted for each group and it should be named shell_your group name.zip. If you have any problems with this please feel free to email Randy or post a message in your discussion area labeled HELP!!

To compress your folder using WinZip:

1. Right click on the folder that contains all of your files and sub folders.
2. Click on Add to “folder name”.zip.
3. Click I Agree.
4. The zipped file will appear on your disk. It will have the extension *.zip and will look like a folder in a vise.

Module 2c

Development of the Website

Must be submitted via your group page File Exchange feature by 4:30 PM on Tuesday, November 21st.

A prototype of your website should be submitted online by the due date. A prototype is a working version of your website, ready for review by a third party. This version will be reviewed by outside sources, so it should be as close to the final product as possible. It should include the following:

1. All pages of the website.
 - Splash page
 - Home page
 - Three informational pages
 - Two interactive pages
2. All media that will be a part of the website on the above pages.
3. All links within the website, functioning properly.
4. All links to outside sources, functioning properly.
5. The PowerPoint component.
6. A list of 3-4 individuals (one for each group member) who will serve as testers and reviewers for your group's web site. Provide their name, occupation, experience with the Internet (in years), and relationship to the group member. These reviewers should include a relative and/or a friend (outside of the university), a member of the community who may be a potential user of the site, and a university student. These individuals should represent various levels of experience in Internet usage.

Post your list to your group discussion area with thread name = Reviewers

Directions

The folder that contains all files pertaining to your website should be compressed utilizing WinZip. This compressed file should then be posted to your group page File Exchange component and should be named "Your Group Name_Prototype.zip".

You should utilize the online communications that you have been using for previous modules. You might also find the file exchange feature very useful for managing your site development. Your use of the online component will continue to be evaluated. Remember that this is 25 out of 90 or 32% of the total points for the group project grade. In addition to your interaction pertaining to the development of your website, other forums will be posted for you to react to. You should check the discussion area frequently (every two days at least). Your progress of the development of the website will be monitored for this module between now and November 21st.

Module 3

Implementing the Website

Must be completed online. (Due November 30th at 4:30 PM).

1. Make sure that your group has your website published to your host server before you leave for the Thanksgiving break. Help in doing this will be available until 3:30 on Tuesday the 21st.
2. By Tuesday, November 28th, each group member should have one person outside of your group and the class review the website. An evaluation form has been provided in the Course Documents area to assist you in this. You might want to do this over the holidays while you are visiting family and friends.
3. An in depth discussion should take place online before Thursday, November 30th at 4:30 PM and must include the following:
 - a. Share and compile the reactions and feedback offered by your individual reviewers.
 - b. Develop an Action Plan to implement these suggestions including possible tasks for each group member, a timeline for making the changes, and any obstacles that you might encounter. The action plan is a hypothetical plan because there is not time enough to implement the changes before the end of the semester.
 - c. Submit the final Action Plan to your group's File Exchange area and name it "Action Plan".

APPENDIX C
STUDENT PERCEPTION SURVEY

In your collaborative effort during the web site project, each group member may have taken on various roles to complete the tasks necessary for each module of the project.

1. Who took the leadership role in your group and how did they facilitate the day-to-day coordination of group activities and the completion of the various modules of the project? Some things to consider might be:
 - Determining strategies for beginning a new module.
 - Assigning responsibilities for carrying out tasks necessary for the completion of a module.
 - Keeping the group on task.
 - Encouraging the exchange of different viewpoints and perspectives and arbitrating any conflicts that may have occurred.
 - Sorting through and organizing information and materials from each group member.
 - Compiling and presenting the required components of each module.
2. What role did you play in your group? How was your role determined?
3. How do you feel about the distribution of project tasks and the contributions that each person made to the project?
4. In what ways did your group evolve in efficiently completing tasks and submitting all required components in a timely manner over the course of the project?
5. How did your group resolve conflicts or come to a consensus on various aspects of the project?
6. How did your group summarize and synthesize individual tasks?
7. How did face-to-face meetings contribute to or distract from the completion of tasks for the modules of the project? How did online communications contribute or distract?

You were exposed to various modes of communications throughout the project. In particular you were required to utilize online communications tools at different phases of the project. Most of you also found a need to meet face-to-face either in class or at a place and time outside of class.

1. What modes of communications did you prefer throughout the project and why.
2. What modes did your group prefer throughout the project and why.
3. How did each mode of communication used by your group aid in both individual and collaborative tasks?
4. How would you compare online communications with more traditional forms (e.g. telephone, face-to-face meetings, and snail mail or e-mail) with regards to collaboration with your classmates?
5. What did you find useful when using online communications in a collaborative environment?
What did you find limiting when using online communications in a collaborative environment?

Now is your chance to tell us what you thought about the collaborative project and this method of instruction.

1. What did you find satisfying about this project?
2. What aspects of the project did you find less satisfying?
3. What suggestions do you have that might help us improve this method of instruction in future courses?

Please answer the following questions. These will provide us with some general information that may be useful to us in the future.

1. How many courses have you taken that required a collaborative project? Please describe the courses (i.e. ELRC 3500, BADM 3100, etc.),
2. How many courses have utilized some form of online communications such as a discussion board or a chat room for instructional purposes? Please describe the courses (i.e. ELRC 3500, BADM 3100, etc.),
3. How many courses have used online communications in conjunction with a collaborative project? Please describe the courses (i.e. ELRC 3500, BADM 3100, etc.).
4. Please provide us with an email address that you frequently check. We may want to contact you in the future for follow-up information.

APPENDIX D
SCORING CRITERIA FOR WEBSITE EVALUATION RUBRIC

Rubric for Scoring Websites

		Rating			Score
Content	Complexity	1	2	3	
	Depth	1	2	3	
	Relevance	1	2	3	
	Accuracy	1	2	3	
Design	Balance	1	2	3	
	Unity	1	2	3	
	Consistency	1	2	3	
	Contrast	1	2	3	
Creativity	Personality	1	2	3	
	Use of Metaphor	1	2	3	
	Unusual Perspectives	1	2	3	
	Interactivity	1	2	3	

Content

Complexity: When user leaves the site is there a well developed understanding of the content of the website.

1. Ideas presented in simplistic format.
2. Ideas are developed adequately.
3. Ideas are well developed.

Depth:

1. The content is presented at a surface level without substantive links.
2. The content has some depth and contains minimal links to support this.
3. The content has depth and contains several links to support this.

Relevance:

1. The site contains elements that provide minimal support to the purpose of the website and the intended audience.
2. The site contains elements that provide adequate support to the purpose of the website and the intended audience.
3. The site contains elements that provide excellent support to the purpose of the website and the intended audience.

Writing Style:

1. The text has many errors but has a consistent line of thought
2. The text is easy to understand with minimal errors.
3. The text is clear, concise, and well written.

Design

Balance:

1. Page layout demonstrates a minimal understanding of balance.
2. Page layout demonstrates some understanding of balance.
3. Page layout demonstrates a thorough understanding of balance.

Unity:

1. Website has minimal attributes that unify the central theme (or metaphor).
2. Website has some attributes that unify the central theme (or metaphor).
3. Website numerous attributes that unify the central theme (or metaphor).

Consistency:

1. Minimal consistency of formatting and style throughout the website.
2. Adequate consistency with occasional lapses of formatting and style throughout the website.
3. Excellent consistency of formatting and style throughout the website.

Contrast:

1. The contrast of each page is designed so that the content of the site is hard to read and objects are not emphasized according to their relevance.
2. The contrast of each page is either designed so that the content of the site is hard to read or objects are not emphasized according to their relevance.
3. Effective use of contrast is used on each page so that the content of the site is easy to read and objects are emphasized according to their relevance.

Creativity

Personality: Elements that engage the visitor and provokes feelings.

1. The website has minimal use of mood, tone, and feeling that are integral to the appeal of the website.
2. The website has adequate use of mood, tone, and feeling that are integral to the appeal of the website.
3. The website has excellent use of mood, tone, and feeling that are integral to the appeal of the website.

Use of Metaphor:

1. A metaphor is not present.
2. A metaphor is present and but does not support to the purpose of the site.
3. A metaphor is present and supports to the purpose of the site.

Unusual Perspectives:

1. This site is not unique and contains little to distinguish it from similar sites.
2. This site is contains some elements of uniqueness but does not distinguish itself from similar sites.
3. Creative implementation of design elements make this site unique and distinguishable from other of it's kind.

Interactivity:

1. There are minimal interactive components included in this site.
2. There are a few standard ways for users to interact with the elements of the site.
3. The websites offer several unique ways for users to interact with the elements of the site.

APPENDIX E

SAMPLE CODING

Date: 12/06/01

..\\6 2b&c_Discussion.txt

Page: 1

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Discussion Board

Forum:
Module 2b & c

Current Forum: -- Module 2b & c
Read 10 times

Date: 05-Nov-2000 16:26:00

Author:

Subject: what have you found
[Remove]

Just checking to see what yall have found for your portion of the research. And, I need to make sure that we are still meeting tomorrow (monday, 6th) at 11:30 in front of the CEBA computer lab downstairs.

Organizational~ A-Act on Strategies~ CXB
Other~
Task Activity~

Current Forum: -- Module 2b & c
Read 10 times

Date: 06-Nov-2000 08:42:00

Author:

Subject: Re: what have you found
[Remove]

I am planning on meeting on Monday still. I'll see ya'll then.

Date: 12/06/01

P101: ..._Module 2b&c_Discussion.txt

Page: 2

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Current Forum:
Read 10 times
Date: 06-Nov-2000 13:16:00
Author:
Subject: meeting this morning
[Remove]

I was outside of teh computer lab at 11:30, but I didn't see either of ya'll. I waited for about 15 minutes, but I had to go. I can meet later this evening if ya'll still want to meet, but I don't think that it is really necessary. I was thinking that we could all just submit our stuff to C (if this is ok with you christy) over the file exchange and you could compile it because you have the zip drive and everything. I think that we should each be responsible for our own page:

M - Events Leading up to the war
Me - 3 major battles
C - impact of the war
We need to submit our graphics and sounds to C also. From what it looks like on the green sheet, this does not look too hard. I am going to keep working on my topic and I will check this later. Clet me know if you are ok with compiling it. if not I will go to a lab and do it tonight.

Current Forum: Module 2b & c
Read 8 times
Date: 06-Nov-2000 14:56:00
Author:

] JME
Organizational-
Other~

Organizational- JME
Other~
Task Activity- E-Explore Strategies~
A-Act on Strategies~

P101 _Module 2b&c_Discussion.txt

Date: 12/06/01

073 Subject: Re: meeting this morning
 074 [Remove]
 075
 076

077 I'm sorry I forgot all about that meeting, but that's alright with me if you all just want me to do my
 078 research and than transfer it. I will check this again after class (430).
 079
 080
 081
 082

083 Current Forum: - Module 2b & c
 084 Read 7 times
 085 Date: 06-Nov-2000 21:36:00
 086 Author:
 087 Subject: Re: meeting this morning
 088 [Remove]
 089
 090

091 that's fine I guess, since I have a zip drive.
 092
 093
 094
 095
 096

097 Current Forum: Module 2b & c
 098 Read 12 times
 099 Date: 06-Nov-2000 16:14:00
 100 Author:
 101 Subject: Module 2b
 102 [Remove]
 103
 104

105 I just found out that someone at my sorority house has front page on her computer. The only
 106 problem is that she does not have a zip drive. If ya'll think that I can just save it on a regular disk
 107 and transfer it onto a zip disk later, I can do everything for Modle 2b here. I am going to try to
 108

RMB
 A-Act on Strategies~
 Task Activity~

A-Act on Strategies~
 CXB
 Task Activity~

JME
 E-Explore Strategies~
 Task Activity~
 A-Act on Strategies~

Date: 12/06/01

P101:

Module 2b&c_Discussion.txt

Page: 4

109 start it right now (4:00) Please send me your graphics and music so that I can do your pages too.
 110 I'm sure that Dr. M won't mind if we make a few changes after we turn it in if ya'll don't
 111 like what I do. Let me know if this sounds good.
 112
 113
 114
 115
 116

117 Current Forum: Module 2b & c
 118 Read 9 times
 119 Date: 06-Nov-2000 16:34:00
 120 Author:
 121 Subject: Re: Module 2b
 122 [Remove]
 123

124 That sounds like a good idea to me, but I still have some work to do. And I am a little confused
 125 as to exactly what I'm supposed to do with all my text stuff do I type up in word and cut and
 126 paste it later. Basically I'm confused as to what I am supposed to do with all my research. Talk to
 127 me.
 128
 129
 130
 131
 132
 133
 134

135 Current Forum: Module 2b & c
 136 Read 10 times
 137 Date: 06-Nov-2000 18:33:00
 138 Author:
 139 Subject: Re: Module 2b
 140 [Remove]
 141
 142
 143
 144

From what I understand, we do not need any of the research yet. Look at your green sheet. It

A-Act on Strategies-
 RMB
 Task Activity-

Date: 12/06/01

P101: . . . _Module 2b&c_Discussion.txt

Page: 5

145 shows an example of what is due tomorrow. It is basically just where we want to put everything
 146 on each page, not necessarily the actual info. All I really need from you tonight is your graphics
 147 and any sound clips or video clips that you would like to use. I am just going to go ahead and do
 148 the formatting of each page. We can change it later if ya'll think of something better. You can
 149 either e-mail your graphics to me as an attachment or send them through the file exchange. I
 150 would really rather if you e-mailed them to me because I really do not know how to use the file
 151 exchange. I'll check this again in a little while.

152
 153
 154
 155
 156
 157
 158 Current Forum:

159 Read 9 times

160 Date: 06-Nov-2000 19:39:00

161 Author:

162 Subject: Re: Module 2b

163 [Remove]

164
 165

166 J

167 I am emailing my graphics to you on jengli1@lsu.edu as of now I do not have any sound or video.
 168 If I find some appropriate clips I will put them in my page.

169
 170
 171
 172
 173

174 Current Forum: Module 2b & c

175 Read 9 times

176 Date: 06-Nov-2000 19:46:00

177 Author:

178 Subject: Re: Module 2b

179 [Remove]

180

E-Explore Strategies~ JME
 Task Activity~

Organizational~
 Other~

A-Act on Strategies~
 RMB
 Task Activity~

P101: The _Module 2b&c_Discussion.txt

Date: 12/06/01

Hopefully ya'll will check this again tonight, but I told you wrong earlier. We do need the text that we will be using in the website. If ya'll get this tonight please e-mail me your graphics, text, videos, and sounds. thanks

A-Act on Strategies~
JME
Task Activity~

Current Forum:

Read 8 times

Date: 06-Nov-2000 21:50:00

Author:

Subject: Re: Module 2b

[Remove]

CXB
Task Activity~
E-Explore Strategies~
A-Act on Strategies~
Shows Antagonism~
Socio-Emotional~

I don't think you actually need the actual graphics, I think you just need to arrange where things will go. Say if we have three graphics each, we need to say where graphic one will go, and where graphic two will go. The same for the text. I have six graphics so far and a lot of text. Arrange it how you like, because I don't have front page. I am sorry for getting online so late, I had class all day and then had to work. I got to Ceba about 10-15 minutes late, and I looked all over for yall but didn't see yall anywhere. Sorry. I guess it doesn't matter now though.

Current Forum:

Read 9 times

Date: 06-Nov-2000 21:39:00

Author:

Subject: Re: Module 2b

[Remove]

Date: 12/06/01 P101: _Module 2b&c_Discussion.txt

217] CXB
218] A-Act on Strategies~
219] Task Activity~
220]

I'm not sure what we have to do either. I'll get back to yall in a few minutes, I've got some more to do too.

221
222
223
224
225 Current Forum: Module 2b & c
226 Read 8 times
227 Date: 06-Nov-2000 21:38:00
228 Author:
229 Subject: Re: Module 2b
230 [Remove]
231

232] CXB
233] Shows Agreement~
234] Socio-Emotional~
235]
236]
237]

Sounds much better. I'll try and send it to you.

238
239 Current Forum: -- Module 2b & c
240 Read 9 times
241 Date: 06-Nov-2000 21:51:00
242 Author:
243 Subject: videos, etc.
244 [Remove]
245

246] A-Act on Strategies~
247] CXB
248] Task Activity~
249]
250]
251]
252]

I haven't found any videos or animations yet. I did find the gettsburg address though (in print), and I am going to try and get my husband or my dad to record it.

P101: _Module 2b&c_Discussion.txt

Date: 12/06/01

253 Current Forum: Module 2b & c
 254 Read 8 times

255 Date: 13-Nov-2000 15:38:00

256 Author:

257 Subject: reloading new information
 258 [Remove]
 259

260
 261 J can you re-upload the folder for the website. I think there are new graphics that are on
 262 your disk but not uploaded onto the discussion board (the graphics from when we met on
 263 Thursday). I'll try to e-mail you just in case you don't check the discussion board before
 264 tomorrow.
 265

266 ---C
 267

272 Current Forum: Module 2b & c

273 Read 7 times

274 Date: 14-Nov-2000 12:47:00

275 Author:

276 Subject: Re: reloading new information
 277 [Remove]
 278

279
 280 I reloaded the zipped file and all of the new pictures should be on there. I also need you to e-mail
 281 or upload the pictures that you used for your page. I am in class right now and we are not doing
 282 anything. Everybody is just working on their pages. Are we going to meet on Thursday?
 283

]] A-Act on Strategies~ CXB
 Task Activity~

]] Organizational~
 Other~

]] JME

]] A-Act on Strategies~
 Task Activity~

]] Organizational~
 Other~

P101: _Module 2b&c_Discussion.txt

Date: 12/06/01

289 Current Forum:

290 Read 8 times

291 Date: 15-Nov-2000 13:36:00

292 Author:

293 Subject: Re: reloading new information

294 [Remove]

295

296

297 Sorry that I was not able to make class on Tuesday I've been sick I think we should meet
 298 Thursday.

299

300

301

302

303

304 Current Forum: Module 2b & c

305 Read 9 times

306 Date: 15-Nov-2000 14:25:00

307 Author:

308 Subject: Re: reloading new information

309 [Remove]

310

311

312 Let's definitely plan on meeting on Thursday at 12:00 outside of the Ceba lab to make sure that
 313 we have everything together.

314

315

316

317

318

319

320

321 Current Forum: -- Module 2b & c

322 Read 9 times

323 Date: 15-Nov-2000 23:03:00

324 Author:

] RMB

] Shows Antagonism~
 Socio-Emotional~

] JME

] Organizational~
 Other~

325 | Subject: Re: reloading new information
 326 | [Remove]

327
 328
 329 | yes, meeting on thursday sounds good. I was sick also. I will also send the pictures that I used
 330 | to you. Well, I guess since it's late, I'll just give them to you tomorrow.

331
 332
 333
 334
 335
 336 | Current Forum: Module 2b & c
 337 | Read 8 times
 338 | Date: 15-Nov-2000 23:07:00
 339 | Author:
 340 | Subject: Thanksgiving Holidays
 341 | [Remove]

342
 343
 344
 345 | J
 346 | You mentioned in an email to me about getting done before the holidays, I think it's due before
 347 | then. It's due in final form, except being published, on Tuesday the 21st, the holidays start on the
 348 | 23rd. It needs to be done by then, I think. I think we pretty much have it done except for
 349 | downloading music clips from the net, and adding any movie clips, or animations, and free
 350 | software. That sounds like alot, but the majority of the info. is there.

351
 352
 353
 354 | Current Forum: -- Module 2b & c
 355 | Read 7 times
 356 | Date: 18-Nov-2000 13:27:00
 357 | Author:
 358 | Subject: what have you found out?
 359 | [Remove]

CXB
] A-Act on Strategies~ Organizational-
] Task Activity~
] Other~

CXB
] Task Activity~
] E-Explore Strategies~
] A-Act on Strategies~

Date: 12/06/01

P101:

Module 2b&c_Discussion.txt

Page: 11

Did either of you find out how to insert the powerpoint? What about putting in free downloads, and about saving sounds to your disk. If you haven't found a way to do that, I found an alternate way. First see if the computer you are on has a microphone hooked up and working. Then, go to ccessories>entertainment> sound recorder. If you are on the internet make sure that both windows (sound recorder and internet) are visible at the same time. Click on record on the sound recorder while holding it up to the speaker of the computer, then play the sound on the computer from wherever it is. You may have to press record again if the sound is louder than the amount of time the recorder records. If you press record at the end of the time, it will continue recording and add more time to the recording. You can edit the sound in sound recorder (take out silent seconds, loop it, etc.). You may have to record the sound several times to get what you want. when you are done just go to file> save as> and save it on your disk. If you find anything out, just post it here or email me.

Current Forum: - Module 2b & c

Read 9 times

Date: 20-Nov-2000 12:25:00

Author:

Subject: Module 2c

[Remove]

From what I understand, a prototype of our website is due on Tuesday and we have to publish this prototype to the web. We can still add in little things after Tuesday. Can ya'll get together tonight (Monday)? I think it will be easy to just combine all of our stuff. It shouldn't take too long. I am going to e-mail ya'll incase you check that more often than this. Anytime to meet is fine with me. I am free for the rest of the day and night.

J

CXB
Task Activity~
A-Act on Strategies~

E-Explore Strategies~

A-Act on Strategies~ JME
Task Activity~
Organizational~
Other~

APPENDIX F

IRB

Application for Exemption from IRB (Institutional Review Board)
Oversight for Studies Conducted in Educational Settings
LSU COLLEGE OF EDUCATION

Title of Study: Computer-Mediated Communication for Collaborative Learning
Principal Investigator: Shirley D. Miller

Name (Print)

Faculty Supervisor: S. Kim MacGregor
(if student project)

Name (Print)

Date of proposed project period: From April 24, 2000 To October 31, 2000

ITEM	YES	NO
1. This study will be conducted in an established or commonly accepted educational setting (schools, universities, summer programs, etc.)	✓	
2. This study will involve children under the age of 18.		✓
3. This study will involve educational practices such as the comparison among educational techniques, curricula, or classroom management strategies.	✓	
4. This study will involve educational testing (cognitive, diagnostic, aptitude, achievement).		✓
5. This study will use data, documents, or records that existed prior to the study.	✓	
6. This study will use surveys or interviews concerning content that is <u>not</u> related to instructional practices.		✓
7. This study will involve procedures other than those described in numbers 3,4,5 or 6. If yes, describe: <u>Collection of digital archives of computer-mediated communication w/ the contents of the course website.</u>	✓	
8. This study will deal with sensitive aspects of subjects' and/or subjects' families' lives, such as sexual behavior or use of alcohol or other drugs.		✓
9. Data will be recorded so that the subjects cannot be identified by anyone other than the researcher.	✓	
10. Informed consent of subject 18 and older, and/or of the parents/guardian of minor children, will be obtained.	✓	
11. Assent of minors (under age 18) will be obtained. (Answer if #2 above is YES)	N/A	
12. Approval for this study will be obtained from the appropriate authority in the	✓	

Attach an abstract of the study and a copy of the consent form(s) to be used. If your answer(s) to numbers 6 and/or 7 is(are) YES, attach a copy of any surveys, interview protocols, or other procedures to be used.

-OVER-

ASSURANCES

As the principal investigator for the proposed research study, I assure that the following conditions will be met:

1. The human subjects are volunteers.
2. Subjects know that they have the freedom to withdraw at any time.
3. The data collected will not be used for any purpose not approved by the subjects.
4. The subjects are guaranteed confidentiality.
5. The subjects will be informed beforehand as to the nature of their activity.
6. The nature of the activity will not cause any physical or psychological harm to the subjects.
7. Individual performances will not be disclosed to persons other than those involved in the research and authorized by the subject.
8. If minors are to participate in this research, valid consent will be obtained beforehand from parents or guardians.
9. All questions will be answered to the satisfaction of the subjects.
10. Volunteers will consent by signature if over the age of 6.

Principal Investigator Statement:

I have read and agree to abide by the standards of the Belmont Report and the Louisiana State University policy on the use of human subjects. I will advise the Office of the Dean and the University's Human Subject Committee in writing of any significant changes in the procedures detailed above.

Signature William Randall Thomas Date April 20, 2000

Faculty Supervisor Statement (for student research projects):

I have read and agree to abide by the standards of the Belmont Report and the Louisiana State University policy on the use of human subjects. I will supervise the conduct of the proposed project in accordance with federal guidelines for Human Protection. I will advise the Office of the Dean and the University's Human Subject Committee in writing of any significant changes in the procedures detailed above.

Signature S. Kim MacGregor Date April 19, 2000

Reviewer recommendation:

☒ exemption from IRB oversight. (File this signed application in the Dean's Office.)

☐ expedited review for minimal risk protocol. (Follow IRB regulations and submit 3 copies to the Dean's Office.)

☐ full review. (Follow IRB regulations and submit 13 copies to the Dean's Office.)

D. Lander D. Lander 4.19.00

Name of Authorized Reviewer (Print) /

Signature

/ Date

Consent Form

1. **Study Title:** Computer-Mediated Communications for Collaborative Learning: An Exploratory Study of the Collaborative Processes Involved in Completing a Semester Group Project Utilizing Asynchronous and Synchronous Communications Tools.
2. **Performance Site:** Louisiana State University and Agricultural and Mechanical College
3. **Investigators:**
 - a. *Faculty Advisor:* S. Kim MacGregor — (225)388-6900
 - b. *Principal Investigator:* William Randall Thomas — (225)292-2150
4. **Purpose of the Study:** This research will investigate educational practices in a compressed video/Web enhanced learning environment. It is hoped that the findings of this study will provide insights that will improve practices used to deliver college level courses utilizing this technology.
5. **Subject Inclusion:** Individuals enrolled in LIS 7008 for the spring of 2000.
6. **Number of Subjects:** 50-55
7. **Study Procedures:** Subjects will be asked to complete online surveys and to participate in online interviews. Each survey will take no longer than 15 minutes to complete and will be conducted at a time that is convenient to the subject or researcher. These interviews will be conducted via a secure website and will cover topics relevant to this research. The participation time for these forums may vary but should take less than an hour. These forums will be set up so that they can be visited anytime and anyplace from a computer that has Internet access. Transcripts of online class discussions that students participate in, via their course website, will be analyzed by the investigators. In addition, usage data collected from the website will be analyzed by the researchers. All student project materials and evaluation of those materials will be made available to the investigators.
8. **Benefits:** It is hoped that this study will provide insights and findings that will contribute to the body of knowledge in the discipline of distance education. Students and instructors may benefit from the results of this study in future courses they are involved in using this technology.
9. **Risks:** There will be no risks, either physical or with regards to academic professional standing, associated with any data collected for or any analysis performed on that data in this study. If there are any concerns please feel free to contact the project director
10. **Right to Refuse:** Your participation in this study is entirely voluntary and you may withdraw consent and terminate participation at any time without consequence.
11. **Privacy:** Any data that is collected for this study will only be viewed by the researchers. Participant names associated with any data will be replaced with an identification number that will only be known by the investigators. This number will be assigned immediately after data has been collected and transcribed. Participants true names will not be used in any publications that result from this study.

I consent to participate in the CMCL study ☒ _____ Date _____

VITA

William Randall Thomas the was first of two children born to William O. and Bertha V. Thomas in Bossier City, Louisiana on January 7th, 1956. He culminated his K-12 education in 1974, graduating from Bossier High School with honors and having been actively involved in the production of the school newspaper and attaining the highest rank in the high school marching and concert band of captain. After pursuing a career in the food service industry Randy attained a Bachelor of Arts from Louisiana State University in Shreveport in 1987 concentrating his studies in the area of psychology, computer science, mathematics and education. Following several more years in food service he decided to fulfill a lifetime ambition of teaching secondary mathematics and computer science becoming certified in these areas in 1992. He devoted the next five years to teaching students with learning disabilities at Gables Academy in Baton Rouge, Louisiana. During this period he also began work towards his Doctor of Philosophy in Educational Leadership and Research with a concentration in educational technology research and development at Louisiana State University A&M College in Baton Rouge. In 2001 he received a Master of Arts in Educational Research from the same institution. He is currently a mathematics instructor at St. Joseph's Academy of Baton Rouge.